FURUNO

INSTALLATION MANUAL

MARINE RADAR

MODEL FR-8062/8122/8252



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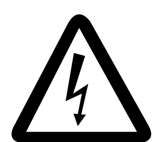
Pub. No. IME-35390-D3

(YOSH) FR-8062/8122/8252

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⚠ SAFETY INSTRUCTIONS

⚠ WARNING



Do not open the equipment unless totally familiar with electrical circuits and service manual.

ELECTRICAL SHOCK HAZARD

Only qualified personnel should work inside the equipment.



Wear a safety belt and hard hat when working on the antenna unit.

Serious injury or death can result if someone falls from the radar mast.

Construct a suitable service platform from which to install the antenna unit.

Serious injury or death can result if some-one falls from the radar mast.

Turn off the power at the mains switch-board before beginning the installation.

Fire, electrical shock or serious injury can result if the power is left on or is applied while the equipment is being installed.

⚠ CAUTION

Observe the following compass safe distances to prevent deviation of a magnetic compass.

	Standard	Steering
Display unit	0.60 m	0.35 m
Antenna unit FR-8062 (24 rpm)	1.95 m	1.25 m
FR-8062 (48 rpm)	1.90 m	1.20 m
FR-8122	1.10 m	0.70 m
FR-8252	1.80 m	1.15 m
Power supply unit	0.80 m	0.50 m

⚠ WARNING

Radio Frequency Radiation Hazard

The radar antenna emits electromagnetic radio frequency (RF) energy which can be harmful, particularly to your eyes. Never look directly into the antenna aperture from a close distance while the radar is in operation or expose yourself to the trans-mitting antenna at a close distance.

Distances at which RF radiation levels of 100 and 10 W/m^2 exist are given in the table below.

Note: If the antenna unit is installed at a close distance in front of the wheel house, your administration may require halt of transmission within a certain sector of antenna revolution.

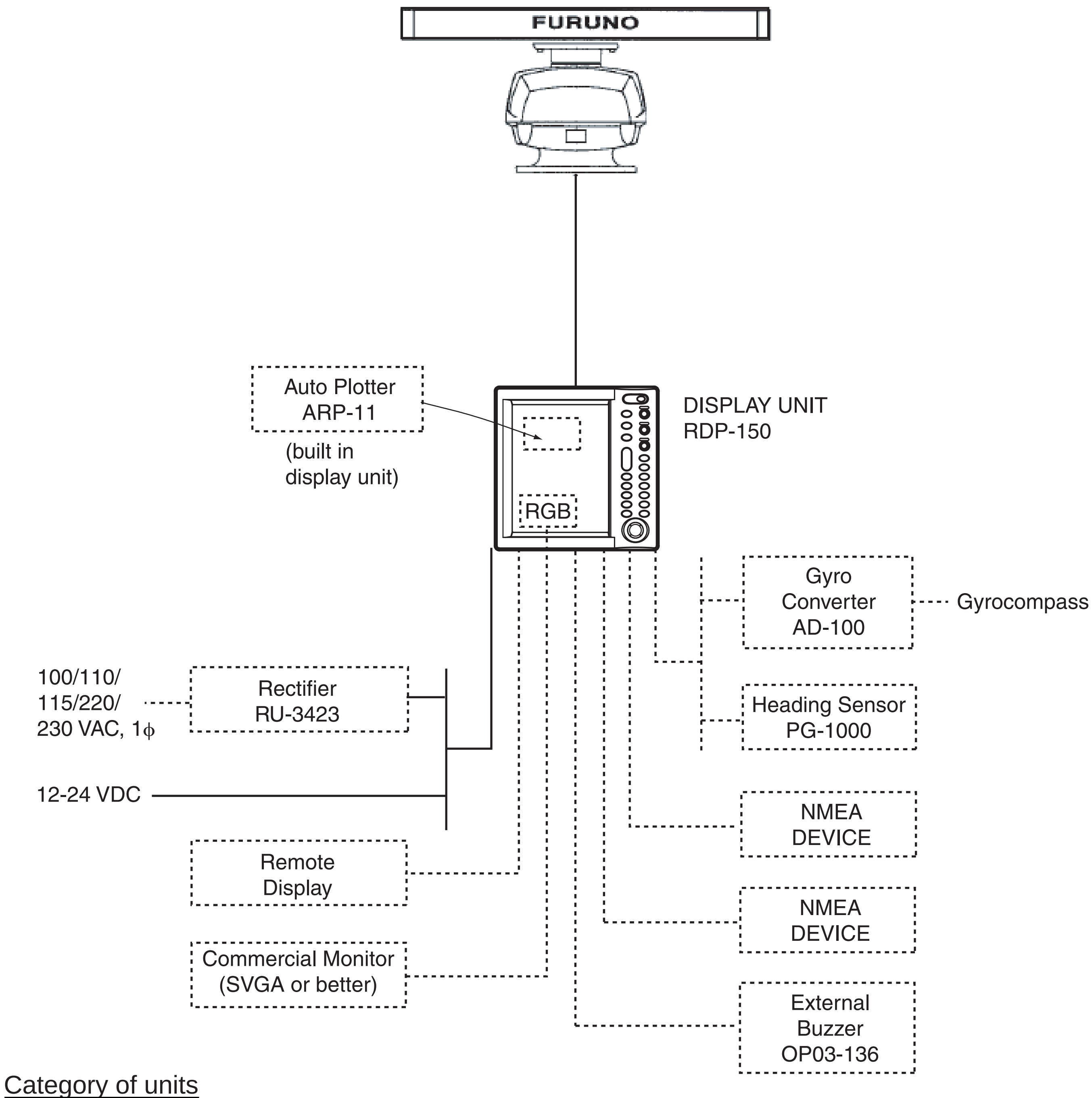
MODEL	Distance to 100 W/m^2 point	Distance to 10 W/m^2 point
FR-8062 XN-12A (4')	—	1.2 m
FR-8062 XN-13A (6')	—	1.1 m
FR-8122 XN-12A	0.2 m	2.3 m
FR-8122 XN-13A	0.2 m	1.6 m
FR-8252 XN-12A	0.4 m	4.6 m
FR-8252 XN-13A	0.4 m	3.1 m

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SYSTEM CONFIGURATIONS

FR-8062/8122

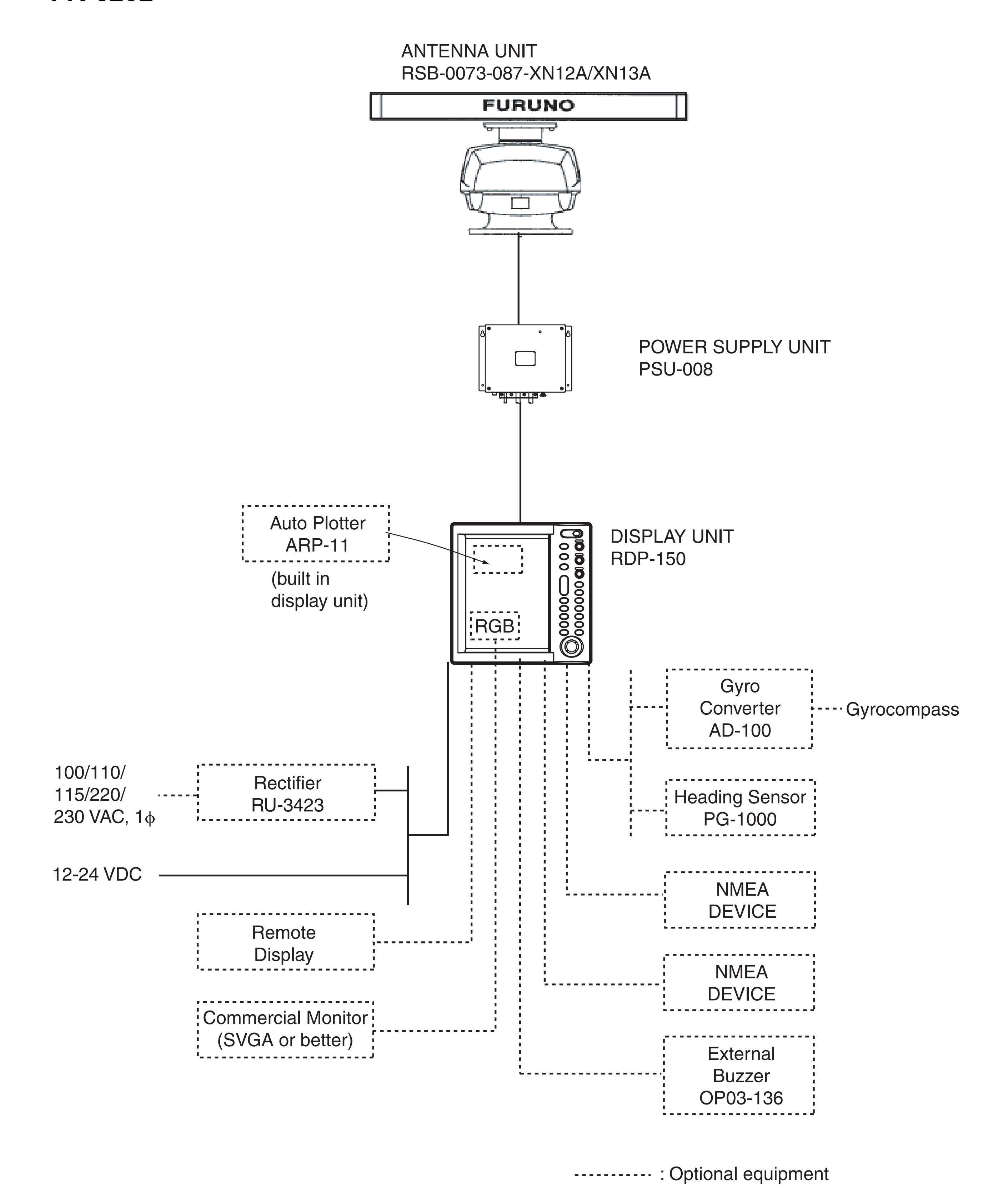
ANTENNA UNIT
RSB-0073-085-XN12A/XN13A: FR-8062
RSB-0073-086-XN12A/XN13A: FR-8122



Category of units
Antenna unit: Exposed to weather
All other units: Protected from weather

----------- : Optional equipment

FR-8252



Category of units
Antenna unit: Exposed to weather
All other units: Protected from weather

EQUIPMENT LISTS

Standard Supply

Name	Type	Code No.	Qty	Remarks
	XN12A-RSB-0073-085	-		FR-8062, 1255 mm, 48 rpm
	XN13A-RSB-0073-085	-		FR-8062, 1795 mm, 48 rpm
	XN12A-RSB-0073-086	-	1	FR-8122, 1255 mm, 24/48 rpm
	XN13A-RSB-0073-086	-		FR-8122, 1795 mm, 24/48 rpm
	XN12A-RSB-0073-087	-		FR-8252, 1255 mm, 24/48 rpm
	XN13A-RSB-0073-087	-		FR-8252, 1795 mm, 24/48 rpm
Display unit	RDP-150	-	1	
Power supply unit	PSU-008	-	1	For FR-8252
	CP03-30801	008-552-960	1	For antenna unit
	CP03-30700	000-090-471		10 m signal cable for FR-8062/8122
	CP03-30710	000-090-472	1	15 m signal cable for FR-8062/8122
	CP03-30720	000-090-473		20 m signal cable for FR-8062/8122
Installation materials	CP03-30730	000-090-474		30 m signal cable for FR-8062/8122
	CP03-30500	000-083-620		10 m signal cable for FR-8252
	CP03-30510	000-083-621		15 m signal cable for FR-8252
	CP03-30520	000-083-622	1	20 m signal cable for FR-8252
	CP03-30530	000-083-623		30 m signal cable for FR-8252
	CP03-30900	000-090-464		CP03-30901 & power cable for display unit
Spare parts	SP03-15401	008-553-040	1	15A fuse, 3pcs and 10A fuse, 3pcs

*: See lists on the back of this manual.

Optional Supply

Name	Type	Code No.	Remarks
External buzzer	OP03-136	000-086-443	See ch. 4.
Rectifier	RU-3423	000-030-443	For AC ship's mains
Cable assy.	MJ-A7SPF0007-050C	000-144-418-10	w/7P plug at one end, 5m
	MJ-A6SPF0003-050C	000-154-054-10	w/6P plug at one end, 5 m
	MJ-A6SPF0007-100C	000-159-695-10	For compass, 10 m
	MJ-B24LPF0008-100	000-145-125	10 m for remote display
	MJ-B24LPF0008-200	000-145-126	20 m for remote display
	MJ-B24LPF0008-300	000-145-127	30 m for remote display
Auto plotter	ARP-11	008-523-050	See ch. 4.
Installation materials	CP03-31001	008-556-830	Installation materials for remote display, see ch. 4.
RGB kit	OP03-195	008-553-110	See ch. 4.
Remote controller	RCU-019	000-090-945	With 5 m cable

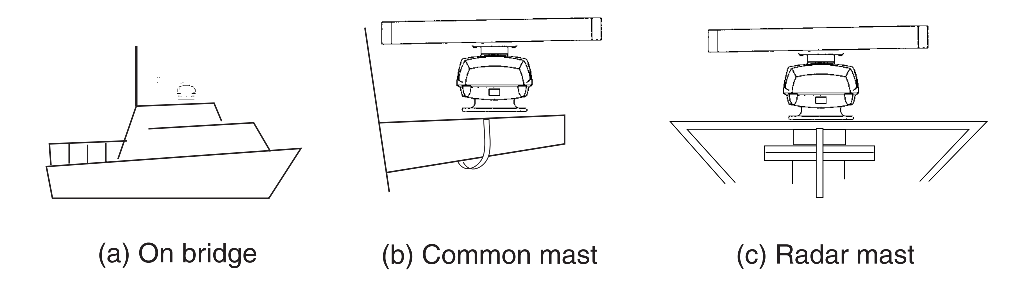
1. MOUNTING

1.1 Antenna Unit

Mounting considerations

- The antenna unit is generally installed either on top of the wheelhouse or on the radar mast on a suitable platform. Locate the antenna unit where there is a good all-round view. Any obstruction will cause shadow and blind sectors. A mast for instance, with a diameter considerably less than the horizontal beamwidth of the radiator, will cause only a small blind sector, but a horizontal spreader or crosstrees in the same horizontal plane as the antenna unit would be a much more serious obstruction; you would need to place the antenna unit well above or below it.
- It is rarely possible to place the antenna unit where a completely clear view in all directions is available. Thus, you should determine the angular width and relative bearing of any shadow sectors for their influence on the radar at the first opportunity after fitting.
- To lessen the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment. Also avoid running the cable in parallel with power cables.
- A magnetic compass will be affected if the antenna unit is placed too close to it. Observe the compass safe distances mentioned in the SAFETY INSTRUCTIONS to prevent interference to a magnetic compass.
- Do not paint the radiator aperture, to ensure proper emission of the radar waves.
- When this radar is to be installed on larger vessels, consider the following points:
    - The signal cable run between the antenna and the display units comes in lengths of 10 m, 15 m, 20 m and 30 m.
    - Deposits and fumes from a funnel or other exhaust vent can adversely affect the aerial performance and hot gases may distort the radiator portion. The antenna unit must not be mounted where the temperature is more than 70°C.

As shown in the figure below, the antenna unit may be installed on the bridge, on a common mast or on the radar mast.



Mounting methods

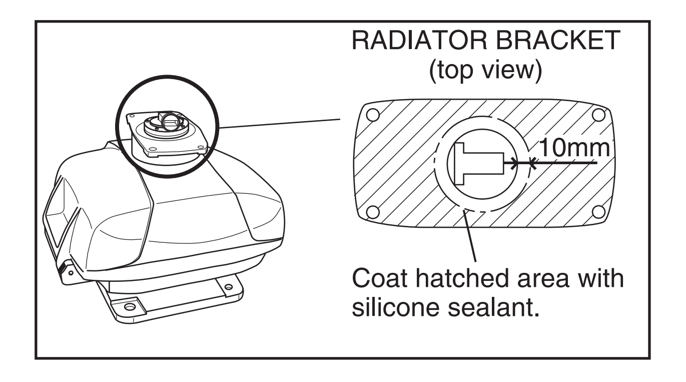
Mounting procedure

Referring to the outline drawing at the back of this manual, drill five holes in the mounting platform: four holes of 15 mm diameter for fixing the antenna unit and one hole of 25-30 mm diameter for the signal cable.

Fastening the radiator to the radiator bracket

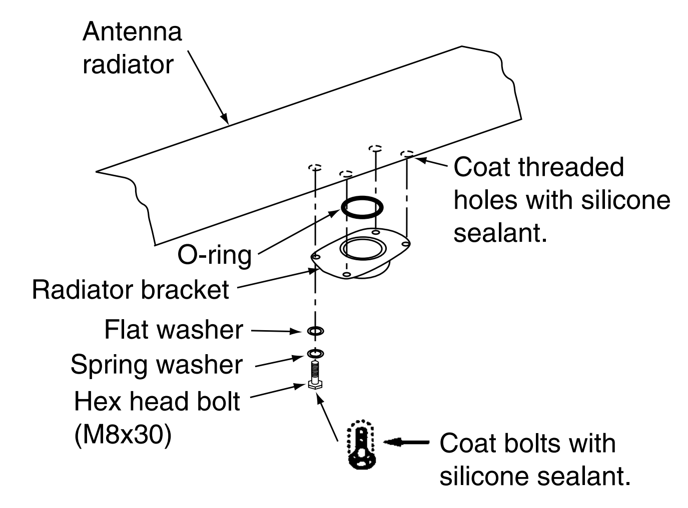
For your reference, the antenna installation materials list appears in the packing list at the back of this manual.

1. Remove the radiator cap from the radiator bracket.
2. Coat contacting surface between the antenna radiator and the radiator bracket with silicone sealant as shown in the figure below.



Coating the antenna with silicone sealant

3. Coat threaded holes on the antenna radiator with silicone sealant.
4. Grease the O-ring and set it to the radiator bracket.
5. Lay the antenna radiator on the radiator bracket.
6. Coat the radiator fixing bolts (4 pcs.) with silicone sealant. Fasten the antenna radiator to the radiator bracket with the radiator fixing bolts, flat washers and spring washers.



Fastening the radiator bracket to the antenna unit chassis

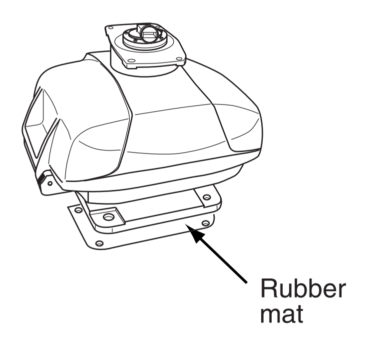
Mounting the antenna unit

The antenna unit can be mounted using the fixing holes on the outside (200x200 mm) or inside (140x150 mm) the antenna unit.

Using outside fixing holes of the antenna housing

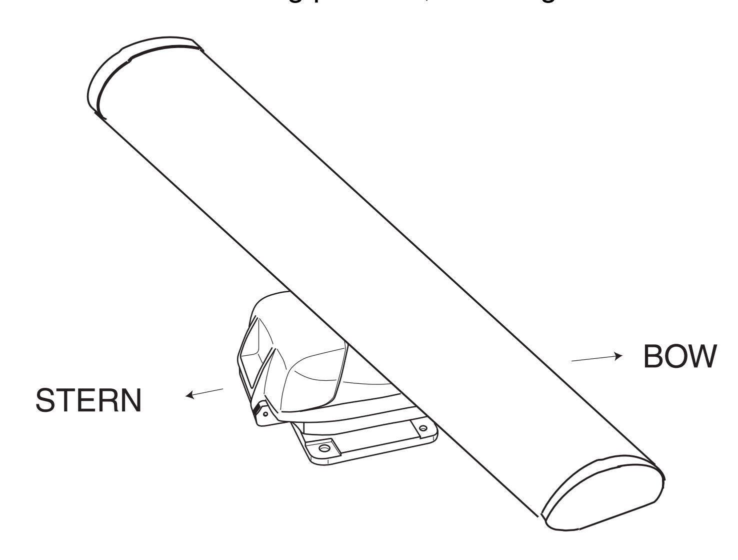
Use the hex head bolts (supplied) to mount the antenna unit as below.

1. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.



Location of rubber mat

2. Lay the antenna unit on the mounting platform, orienting it as shown in below.



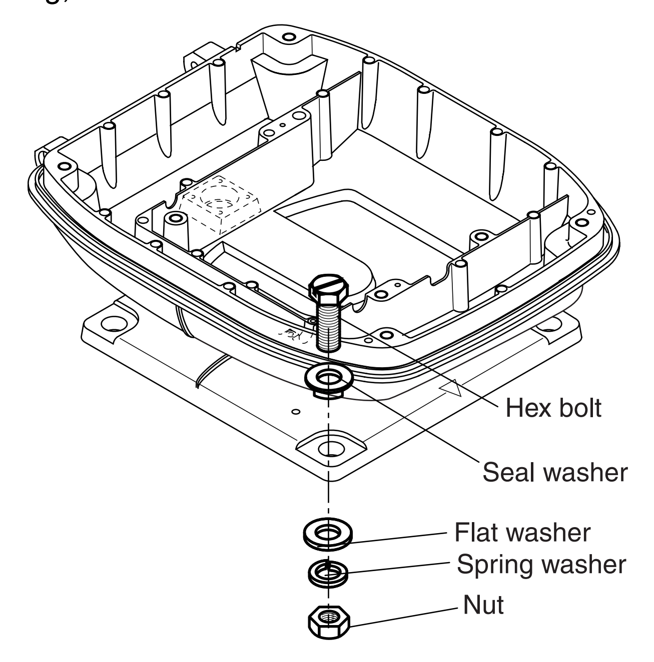
Antenna unit



Do not lift the Antenna unit by the radiator; lift it by the housing.

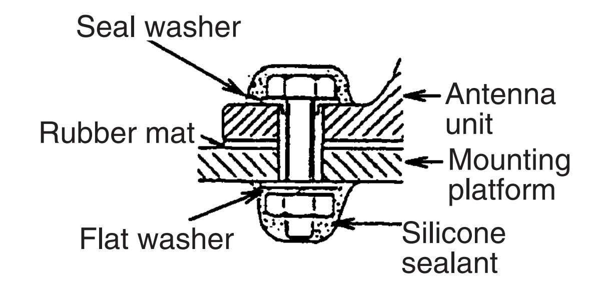
The radiator may be damaged.

3. Insert four hex bolts (M12x60, supplied) and seal washers (Φ30, supplied) from the top of the antenna housing, as shown below.



Fixing the antenna unit chassis

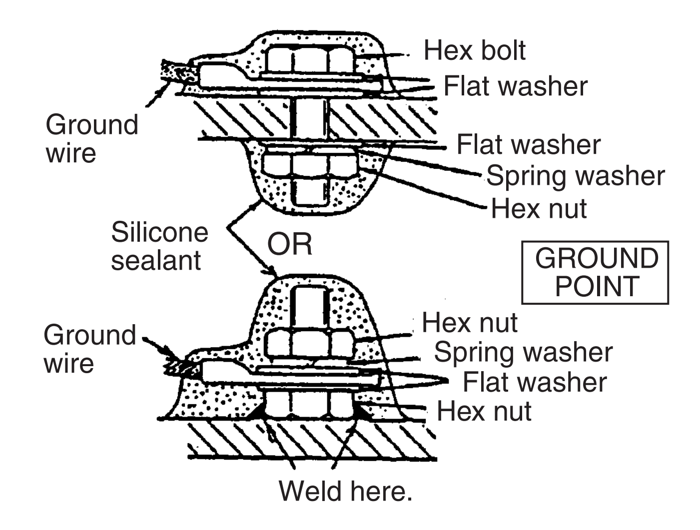
4. Pass flat washers (M12, supplied), spring washers (M12, supplied) and nuts (M12, supplied) onto hex bolts. Fasten by tightening nuts. Do not fasten by tightening the hex bolts; seal washers may be damaged.

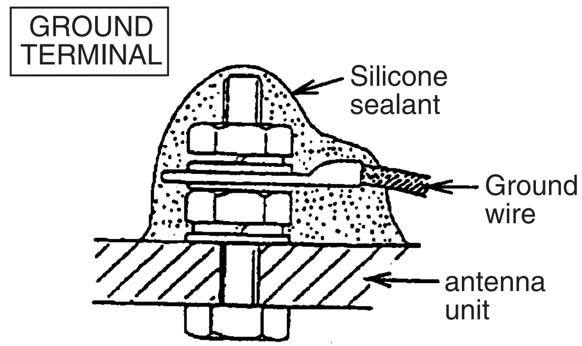


How to fasten antenna unit to mounting platform

5. Coat flat washers, spring washers, nuts and exposed parts of bolts with anticorrosive sealant.
6. Prepare ground point on mounting platform (within 300 mm of ground terminal on antenna unit) using M6x25 bolt, nut and flat washer (supplied).
7. Run the ground wire (RW-4747, 340 mm, supplied) between the ground terminal and ground point.

8. Coat ground terminal and ground point with silicone sealant as shown below.



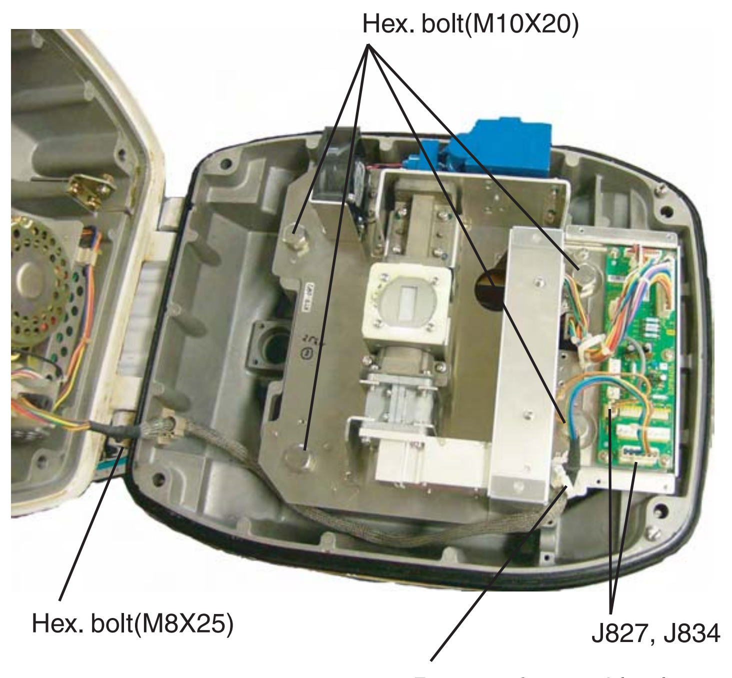


How to coat ground point and ground terminal with silicone sealant

Using inside fixing holes of the antenna housing

This method requires removal of the RF unit in the antenna unit to access inside fixing holes. Use hex head bolts, flat washers, spring washers and nuts (local supply) to mount the antenna unit, confirming length of bolts.

1. Unfasten four antenna bolts on the cover to open the antenna unit.
2. Unfasten four screws on the RTB cover to remove it.
3. Unplug connector J827 and J834 on the RTB board.
4. Separate upper chassis from lower chassis by removing two hex head bolts (M8x25).
5. Remove RF unit by unfastening four hex head bolts.



Antenna unit, opened

7. Lay the corrosion-proof rubber mat (supplied) on the mounting platform.
8. Fasten the lower chassis to the mounting platform with hex head bolts, spring washers, flat washers and nuts (local supply), and then coat flat washers, nuts and exposed parts of bolts with silicone sealant. Cut a slit in the rubber bushing and insert bolt into the bushing. Do not use seal washers.
9. Reassemble RF unit, cover and chassis.
10. Set four knob caps (supplied) into outside fixing holes.
11. Do steps 6-8 in “Outside fixing holes”.

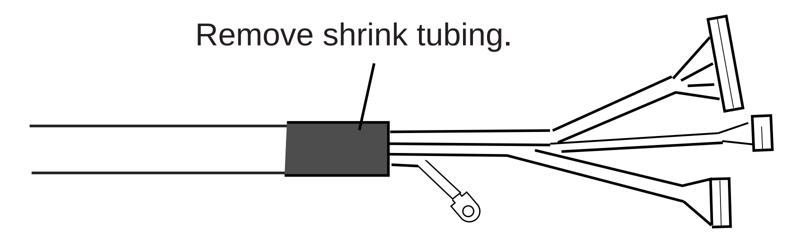
Connecting the signal cable

Only the signal cable runs from the display unit (power supply unit in case of FR-8252) to the antenna unit. In order to minimize the chance of picking up electrical interference, avoid where possible routing the signal cable near other onboard electrical equipment. Also, avoid running the cable in parallel with power cables. Pass the cable through the hole and apply sealing compound around the hole for waterproofing.

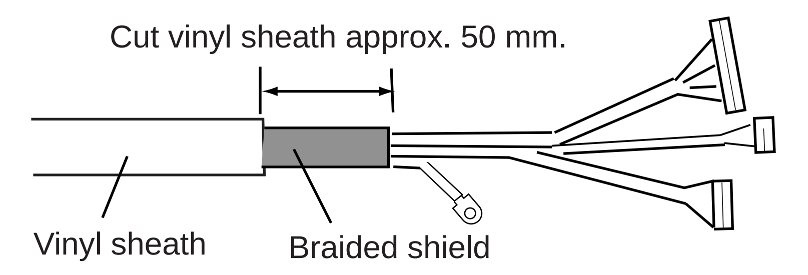
- Fabricating the signal cable

This type of signal cable is used with other models of radar. For this model, the following fabrication is required.

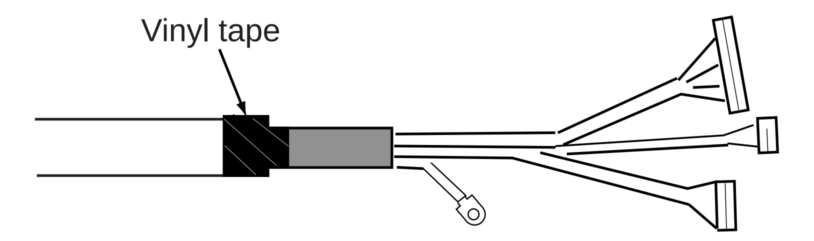
1. Remove shrink tubing from the signal cable.



2. Remove vinyl sheath approx. 50 mm.

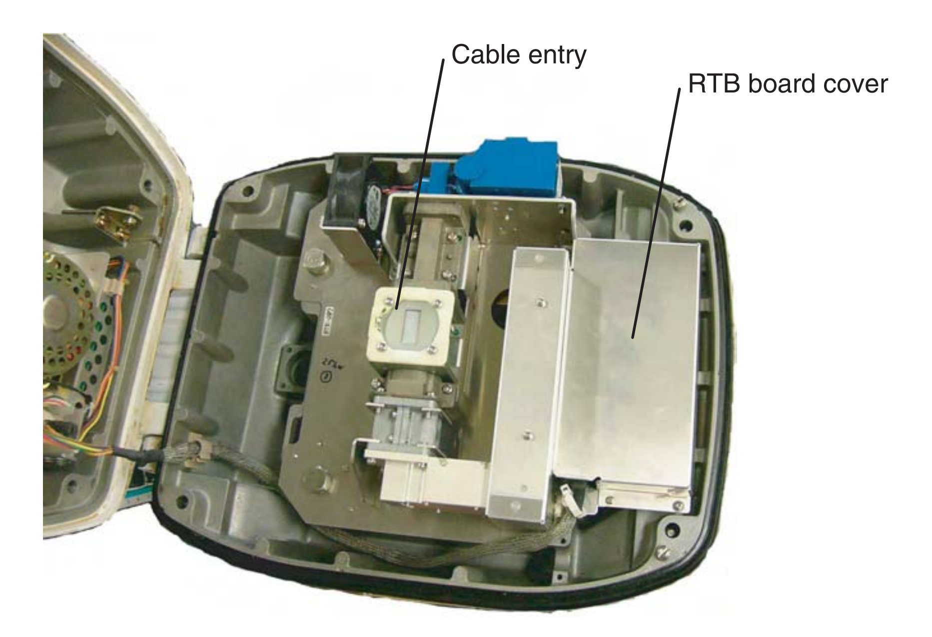


3. Wrap vinyl tape at the end of the vinyl sheath.



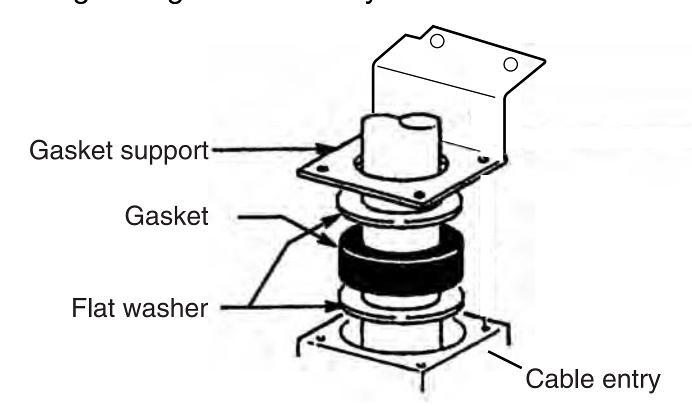
- Connecting the signal cable

1. Open the antenna cover by loosening four bolts, and then fix the stay.



Antenna unit chassis, cover opened

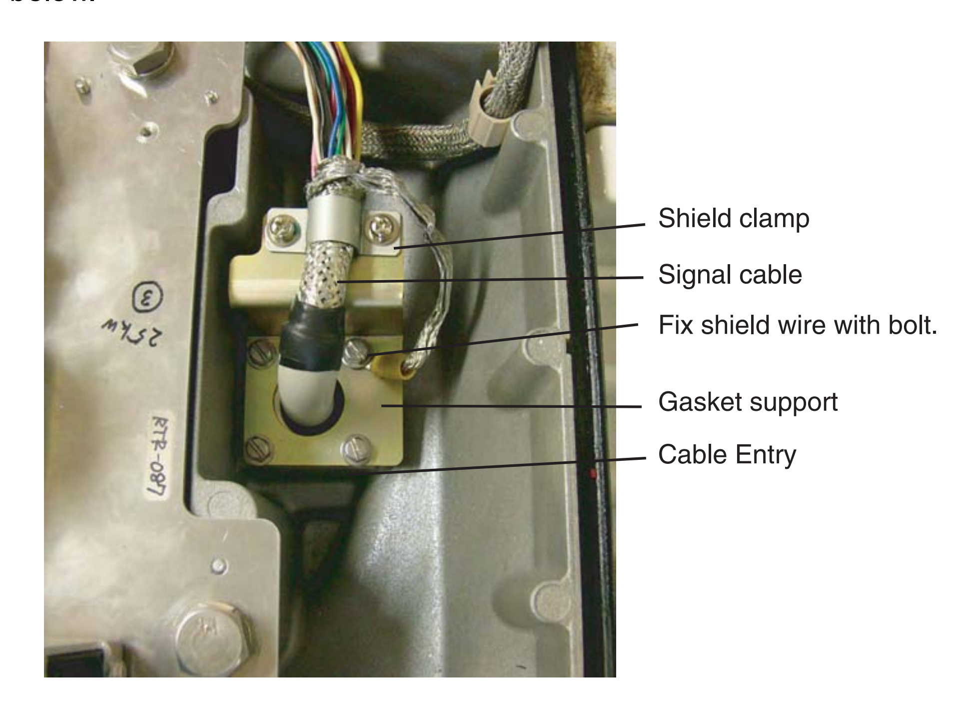
2. Unfasten the cable gland assembly (plate, gasket, flat washer). The plate may be discarded.
3. Pass the signal cable with connector through the bottom of the antenna unit chassis. Pass the cable through the gland assembly as shown below.



Passing the signal cable through the cable gland assembly

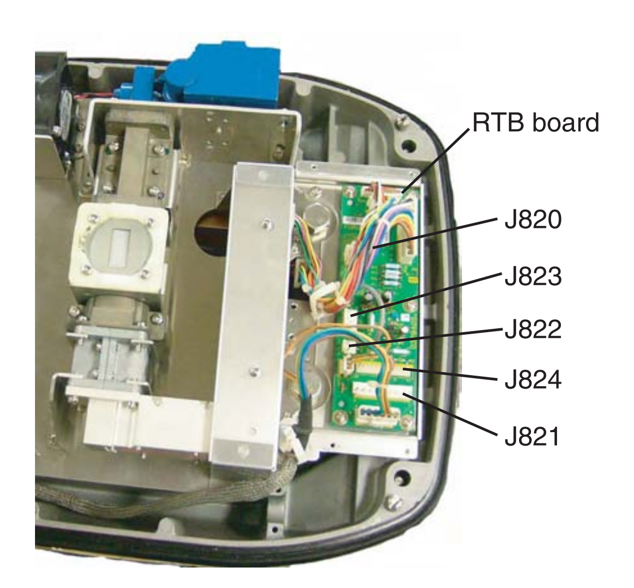
4. Fasten the gasket support with four bolts. Using one of the four bolts, fasten the crimp-on lug to the shield wire.

5. Fasten the shielded part of the signal cable with shield clamp (installation material) as shown below.



How to fix signal cable in cable gland

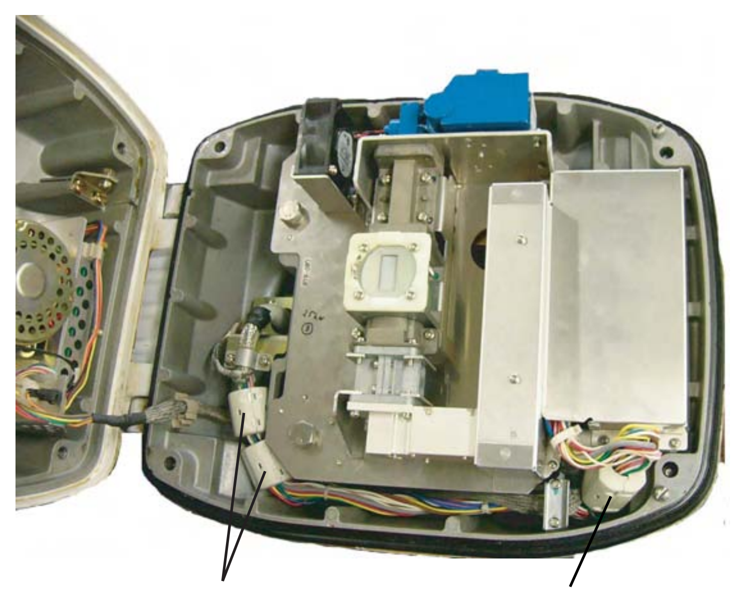
6. Unfasten four screws to remove the RTB board cover.
7. Connect the plugs of the signal cable to the RTB board.
   FR-8062, FR-8122: J821, J823, J824, J822
   FR-8252: J821, J823, J824, J820



Connecting to the RTB board

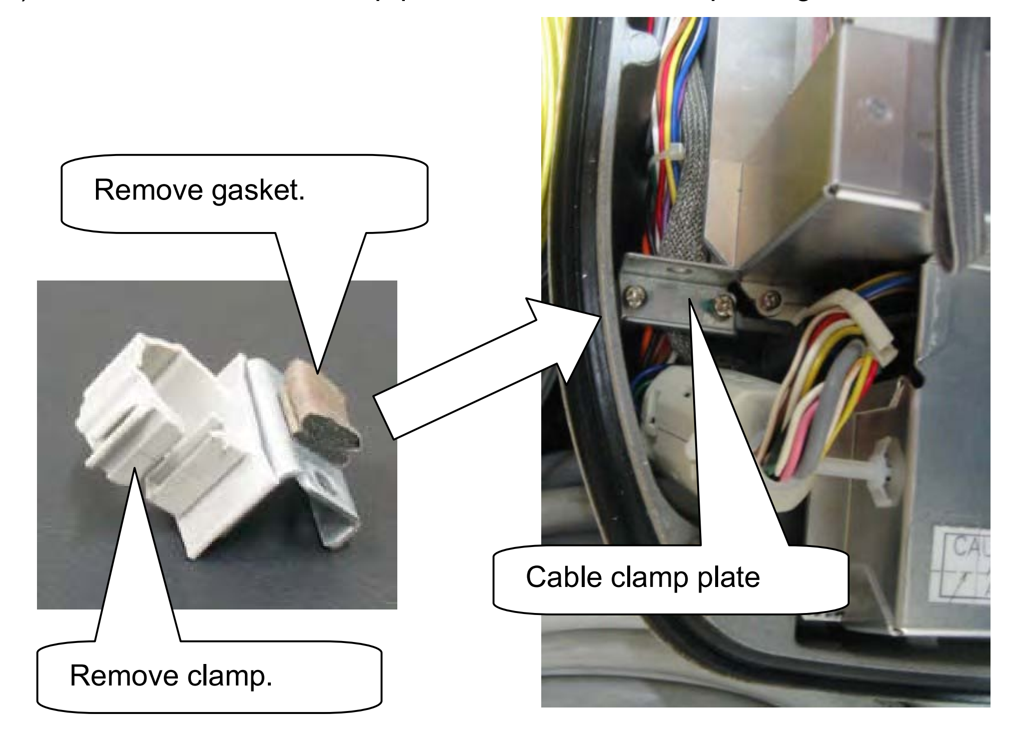
8. Reattach the RTB board cover.

9. Attach three EMI cores to the signal cable as shown below.



Antenna unit chassis, cover opened

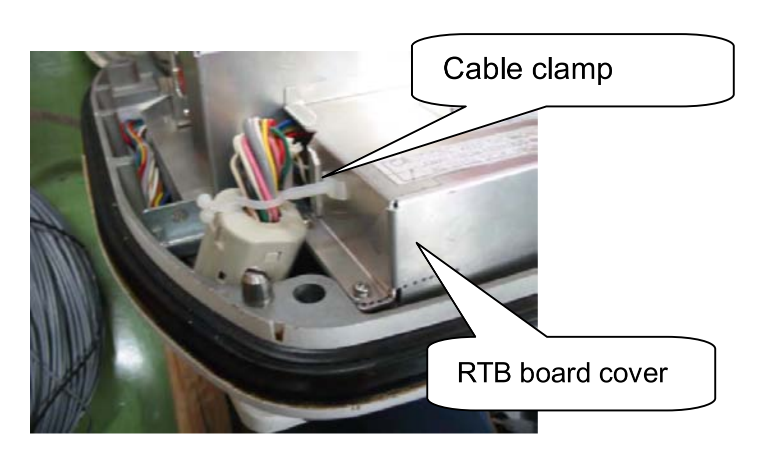
10. Fix the signal cable with the cable clamp as follows.
    a) Dismount the cable clamp plate and remove clamp and gasket.

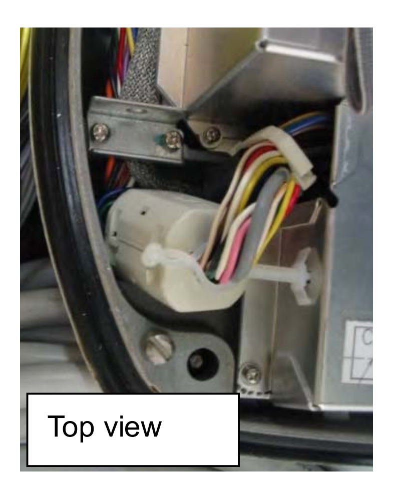


b) Run the signal cable as shown below.



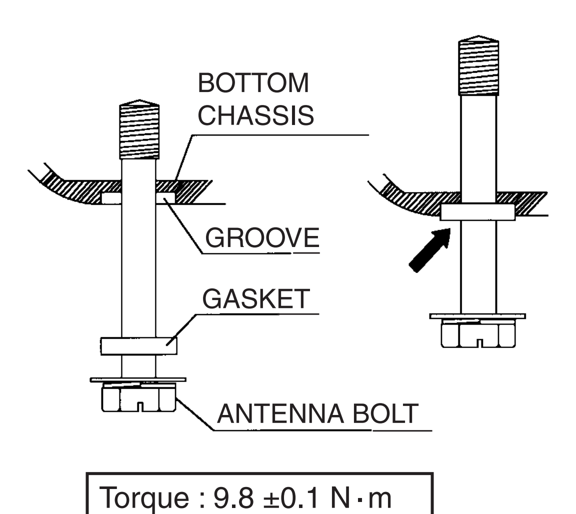
c) Fix the signal cable with cable clamp as shown below.





11. Release the stay and close the cover. Loosely fasten the antenna bolts; you will have to make some adjustments inside after completion of wiring.

Note: When closing the cover, set the gaskets to grooves in the bottom chassis, then tighten bolts.



Torque : 9.8 ±0.1 N·m

1.2 Display Unit

The display unit can be mounted on a tabletop, on the overhead or flush mounted in a console or panel.

Mounting considerations

When selecting a mounting location for the display unit, keep the following in mind:

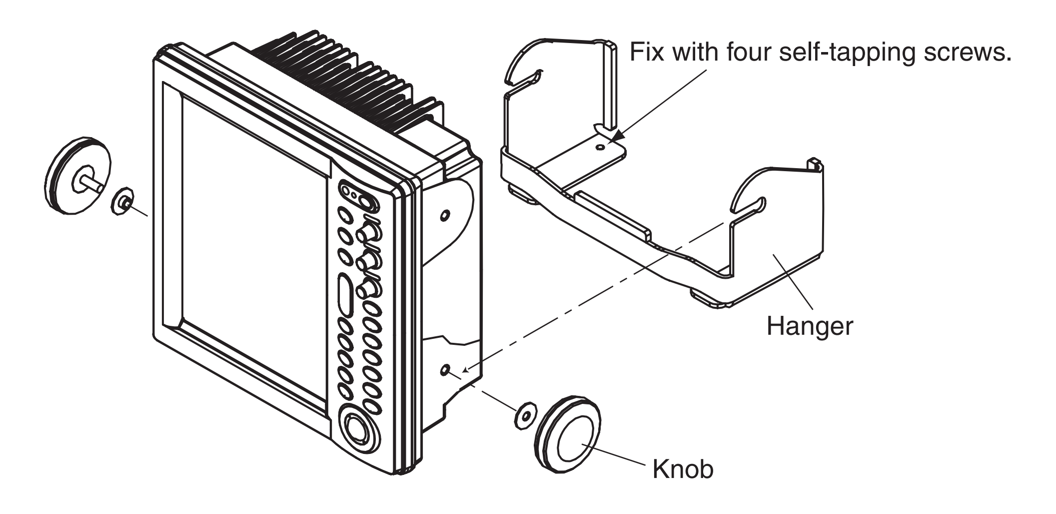
- Keep the display unit out of direct sunlight.
- The temperature and humidity at the mounting location should be moderate and stable.
- Locate the unit away from exhaust pipes and vents.
- The mounting location should be well ventilated.
- Mount the unit where shock and vibration are minimal.
- Keep the unit away from electromagnetic field generating equipment such as motors and generators.
- For maintenance and checking purposes, leave sufficient space at the sides and rear of the unit and leave slack in cables. Minimum recommended space is shown in the outline drawing for the display unit.
- A magnetic compass will be affected if the display unit is placed too close to it. Observe the compass safe distances shown in the SAFETY INSTRUCTIONS to prevent disturbance to the magnetic compass.

Mounting procedure

Tabletop mounting

Follow the procedure below to mount the display unit on a tabletop.

1. Fix the hanger by using four self-tapping screws (5x20).
2. Screw knob bolts in display unit, set it to the hanger, and tighten the knob bolts.

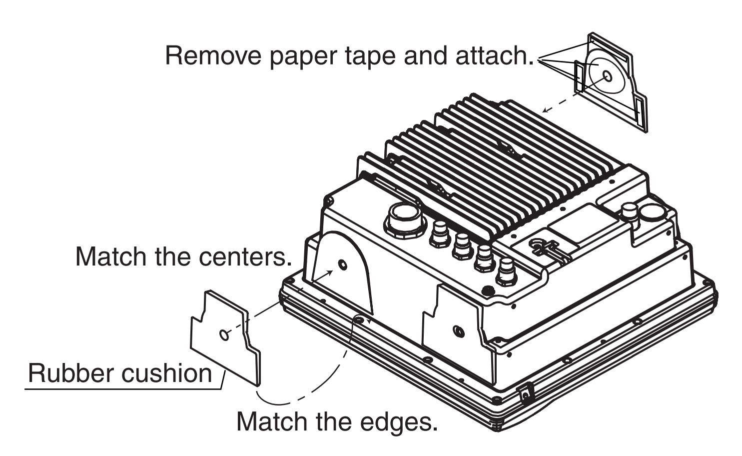


Mounting dimensions of display unit

Overhead mounting

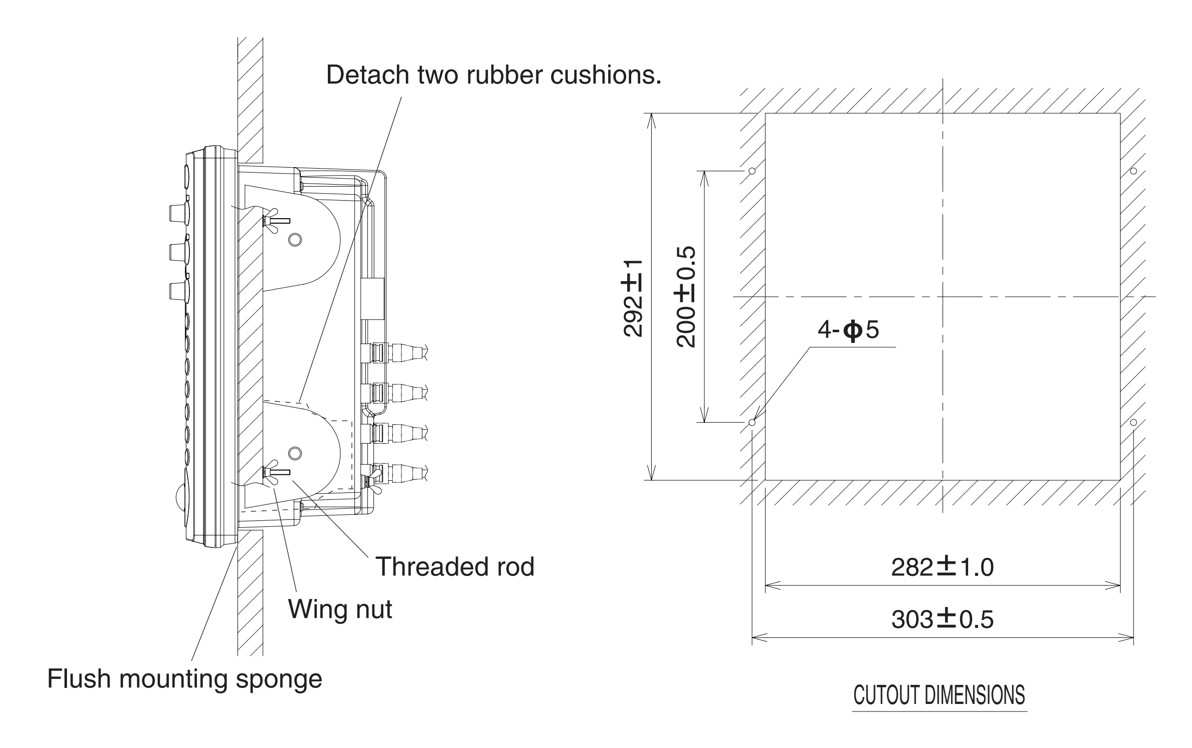
Note: For the overhead mounting, reinforce the mounting location and secure the hanger, with bolts, nuts and washers (local supply).

Attach two rubber cushions to the display unit as shown in the figure below. Then fix the unit with hanger.



Flush mounting

1. Prepare a cutout in the mounting location whose dimensions are as shown below.
2. Detach two rubber cushions from the display unit.
3. Insert the flush mounting sponge and four threaded rods from the rear side of the display unit, and then set the display unit to the mounting location.
4. Fix the display unit by using four wing nuts from the rear side of the display unit.



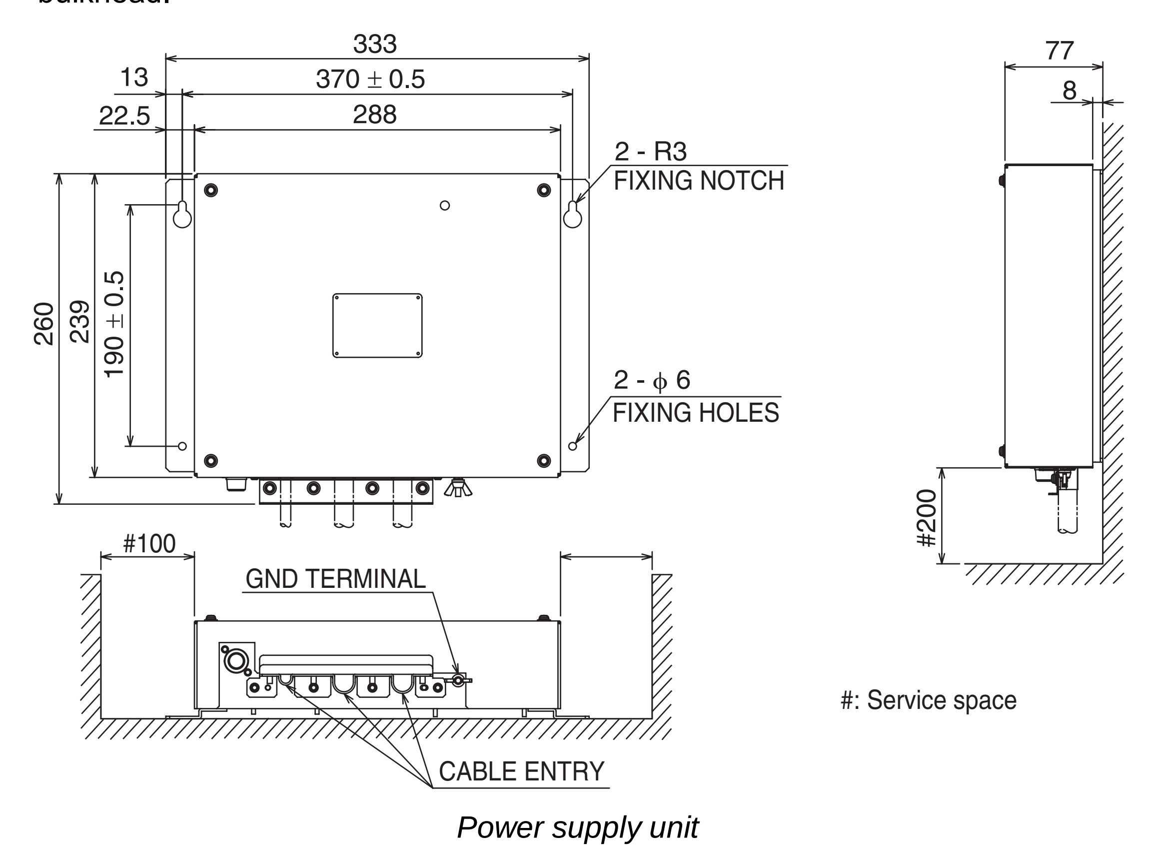
Flush mounting of display unit

1.3 Power Supply Unit

A power supply unit is shipped with the FR-8252, because of its high power consumption.

The power supply unit can be installed almost anywhere provided the location is dry, well-ventilated, sufficient maintenance space is provided and is installed within 5 m (cable length) from the display unit. To fix the unit, use four self-tapping screws (5x20).

Note: Do not install the power supply unit on the overhead; install it on the deck or bulkhead.

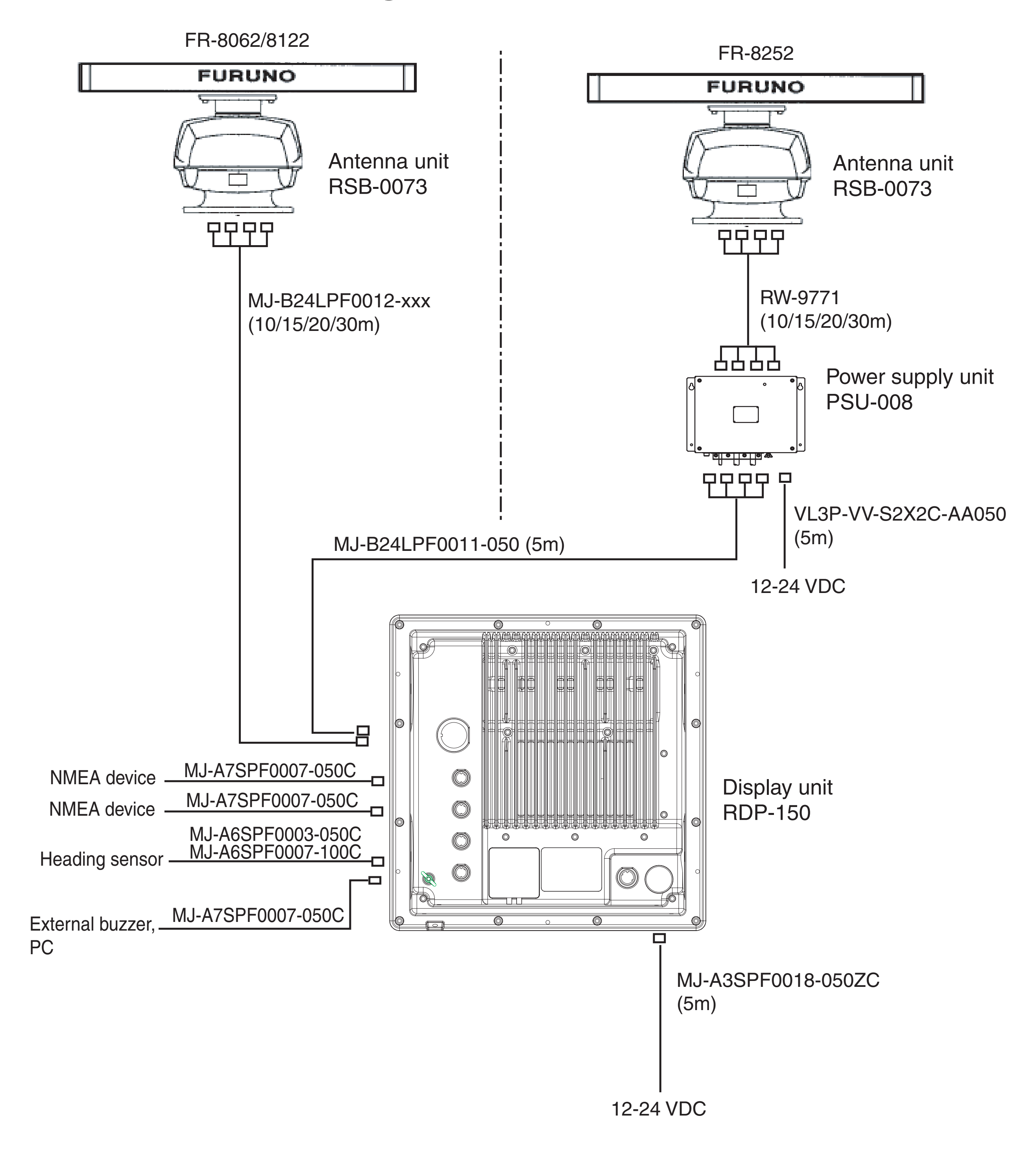


Power supply unit

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2. WIRING

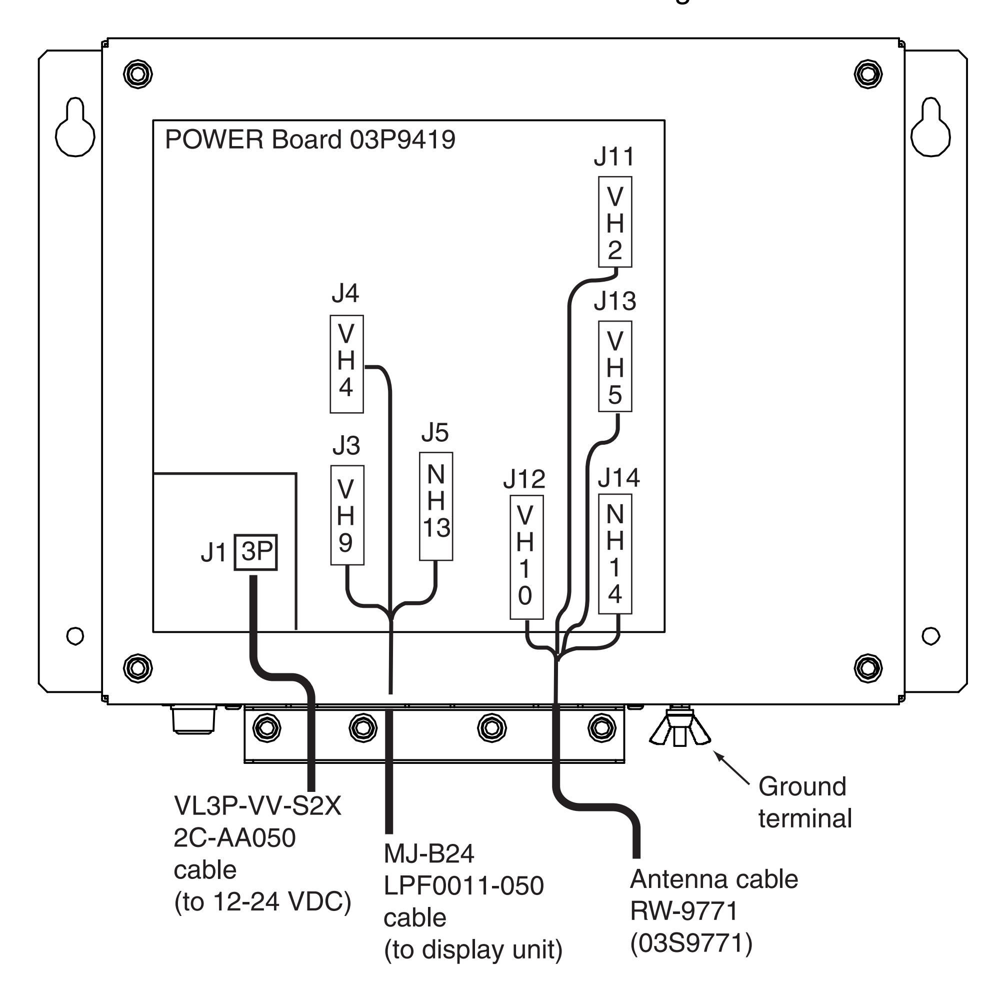
2.1 Standard Wiring



2.2 Wiring the Power Supply Unit

Cabling

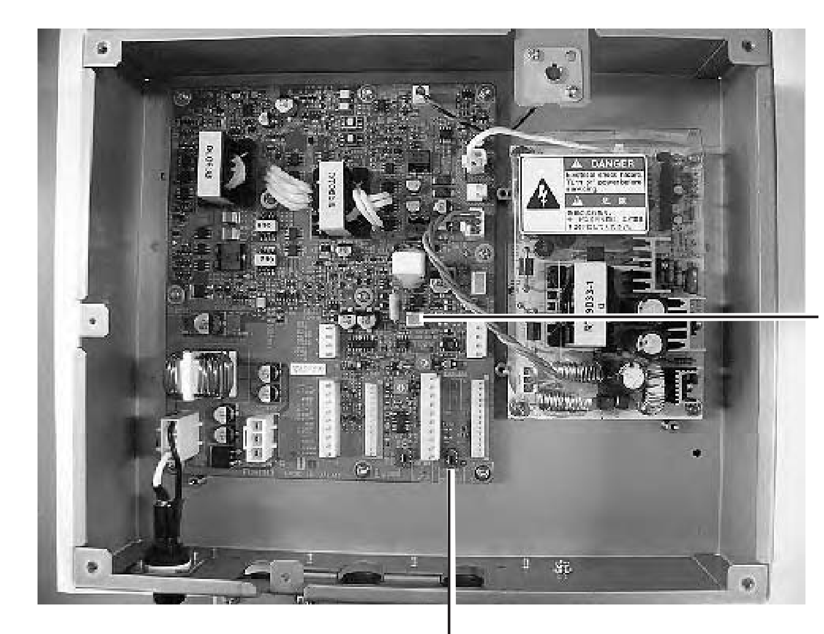
1. Unfasten four screws to remove the cable clamp.
2. Unfasten four screws to remove the cover.
3. Attach the connectors of three cables as shown in the figure below.



4. Lay three cables in respective slots referring to the figure above.
5. Reattach the cover and the cable clamp.
6. Connect a ground wire (local supply, IV-2sq) between the ground terminal and ship's ground.

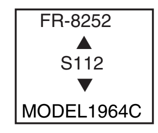
Jumper block, slide switch setting

The jumper block JP1 and slide switch S112 on the PWR board (03P9419) must be set according to radar model. Open the unit, locate JP1 and S112 and set them as below.



Jumper block JP1
("short" for FR-8252 radar;
remove dummy connector and
attach connector assy.
XH2P-L40-ACR.)

Slide switch S112
(Upward position
for FR-8252)



Power supply unit, inside view

Jumper block, slide switch	Function	Setting
JP1	Enables/disables motor slow start circuit.	Short (disable)
S112	TUNE voltage selector (0-12 V, 0-32 V)	Upward position (0-12 V)

Power requirement, replacement of fuses

Power requirement

The power for the power supply unit and display unit must be drawn from the same power switch on the power terminal board.

Replacement of fuses

The power supply unit is shipped with a 15 A fuse(for connection to 12 VDC battery). Replace the fuse with a 7 A (supplied) when the ship’s battery is 24 VDC.

2.3 Port for External Devices

External equipments can be connected here as shown below.

NMEA1(7P)	NMEA2(7P)	HDG (6P)	PC/EXT-BUZZER (7P)
NMEA sentence device	NMEA sentence device	Heading sensor	External buzzer, PC, etc.

This equipment can receive the following NMEA 0183 format sentences from other equipment. You will need the optional NMEA cable to connect with external equipment.

- Course: VTG> RMC
- Waypoint Range: BWR> BWC> RMB, Bearing: BWR> BWC (> RMB*1)
- Heading (True): HDT> VHW> HDG*2> HDM*2> VHW*2
- Heading (Magnetic): HDG> HDM> VHW> HDT*2> VHW*2
- Ship's speed: Over ground: VTG>RMC> VHW, Through water: VHW
- Date: ZDA
- Time: ZDA
- Own ship's position: GNS>GGA>RMC> GLL
- Depth: DPT>DBT
- Wind speed and angle*3: True: MWV>VWT, Relative: MWV>VWR
- Water temperature: MTW

*1: Available when true bearing.
*2: Variation data is required.
*3: True or Relative is changed with menu.

3. SETTING UP THE EQUIPMENT

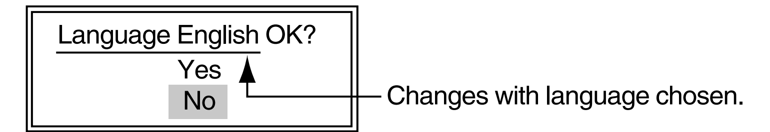
3.1 Setting Language

At the first power application after installation, choose a language as follows.

1. Press ⏻/**BRILL** key to turn the power on.
   "Now Initializing…" appears and after a while the window below appears.



2. Rotate the trackball to choose language desired and press the **ENTER** key.
   The confirmation window appears.



3. Choose **Yes** and press the **ENTER** key.

3.2 Opening the Installation Menu

After you have installed the equipment, set it up as follows.

1. Press the **MENU** key. The main menu appears on the screen.
2. Rotate the trackball downward to choose **Installation**. The installation menu appears in gray to right side of the screen.
3. While pressing down the **CANCEL/HL OFF** key, press the **MENU** key five times to activate the Installation menu.

Menu

- Mark
- Custom 1
- Custom 2
- Custom 3
- Tuning
- GPS Buoy
- Target
- ARP
- AIS
- GPS
- ▼ System
  - Initial
  - Factory
  - Installation
  - Sector Blank 1**

Installation

Item	Setting
Language	: English
Purpose	: Sea
Type	: 8062
View Position	: Center
Input Source	: Main
Antenna Height	: 5 m
Heading Adjust	: 0 °
Manual Timing Adjust	: 0
Tuning Initial Adjust	
Manual MBS Adjust	: 0
Video Initial Adjust	: 0
Auto Installation Setup**	
Antenna Rotation	: Rotate
Local Time Offset	: - 0.1 H
Total TX Time*	: 000000.5 h
Total On Time*	: 000000.6 h
Memory Clear*	

[ENTER]: Enter [CANCEL/HL OFF]: Back
[MENU]: Exit

* : Displayed when scrolled.
** : Set the Section Blank to "Off" in order to execute Auto Installation Setup in the Installation menu.

4. Press the **ENTER** key. The highlighted cursor appears in the Installation menu.
5. Rotate the trackball downward or upward to choose an item in the Installation menu.
6. Press the **ENTER** key to show setting window.
7. Rotate the trackball downward or upward to choose an option.
8. Press the **ENTER** key to confirm setting.
9. Finally, press the **MENU** key to close the main menu.

Basic Settings

Language: Choose an appropriate language.

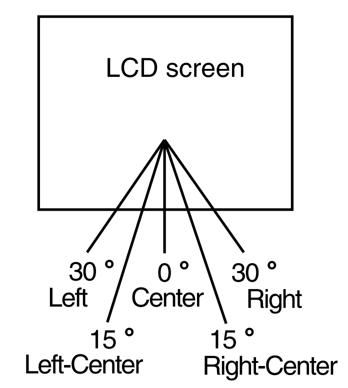
Purpose: Choose the purpose of this radar among River, Sea and IEC. The default setting is Sea.

River: To use this radar on a river.
Sea: To use this radar on high seas.
IEC: To use this radar as the type approved radar.

Type: Choose type of this radar among 8062 (6 kW radar), 8122 (12 kW radar) and 8252 (25 kW radar) to agree with the specifications of the antenna unit. The default setting is 8062. Unsuitable setting may result in malfunction.

View Position: Choose the operating position for this radar among Left, Left-Center, Center, Right-Center and Right to view echo colors correctly. The default setting is Center.

Left: When operating this radar at the left side.
Left-Center: When operating this radar at the left-center side.
Center: When operating this radar at center position.
Right-Center: When operating this radar at the right-center side.
Right: When operating this radar at the right side.
Approx. angle of the view position as follows.



Note: The radar echo and trail echo are adjusted by the View Position. The characters are not adjusted. This setting is also reflected on an external monitor (option).

Input Source: Choose the input source between Main and Sub. The default setting is Main.
Main: When using this display unit as main radar.
Sub: When using this display unit as sub display. For Sub, the "Video Initial Adjust" is required (page 3-6).

Antenna Height: Set the height of the antenna above the water surface among 5, 10, 15, 20, 30, 40 and 50 m. The default setting is 15 m.

Antenna Rotation: "Rotate," the default setting, stops transmission when the antenna is not rotating. "Stop" transmits radar pulses without rotating the antenna.

Local Time Offset: To display local time on the screen, set the time difference from the UTC.

Memory Clear: Restore the default settings. However, Purpose, Type, View Position and Input Source are not restored.

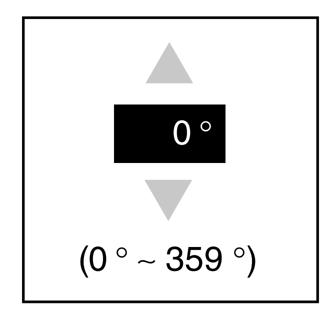
Heading Adjustment

You have mounted the antenna unit facing straight ahead in the direction of the bow. Therefore, a small but conspicuous target dead ahead visually should appear on the heading line (zero degrees).

In practice, you will probably observe some small error on the display because of the difficulty in achieving accurate initial positioning of the antenna unit. The following adjustment will compensate for this error.

1. Set ship's heading toward a suitable target (for example, ship or buoy) at a range between 0.125 and 0.25 nautical mile.

2. Transmit the radar at 0.25 nm range and measure the bearing of that target relative to ship's heading with an EBL.
3. Open the Installation menu, and choose Heading Adjust.
4. Press the **ENTER** key to show the HEADING ADJUST window.



5. Rotate the trackball upward or downward to set the value measured at the step 2 above. Confirm that the target shows dead ahead on the screen.
6. Press the **ENTER** key to conclude the setting.

Auto Installation Setup

When this item is executed, the tuning, timing, video and MSB are automatically adjusted.

Note: Before executing this procedure, confirm that Sector Blank 1 and Sector Blank 2 are off.

1. Transmit the radar at 48 nm range.
2. Choose Auto Installation Setup from the installation menu and press the **ENTER** key.
3. Rotate the trackball to choose **Yes**, and then press the **ENTER** key.
   Automatically, the tune adjustment begins, indicating "Tuning adjusting…." Then, the timing adjustment, video adjustment and MSB adjustment are executed automatically, indicating "Timing adjusting…", "Video adjusting…", and "MSB adjusting…" in that order. After the adjustment is completed, the window disappears.

If you are not satisfied with the result of the Auto Installation Setup, execute Manual Timing Adjust, Tuning Initial Adjust, Manual MSB Adjust and Video Initial Adjust as follows.

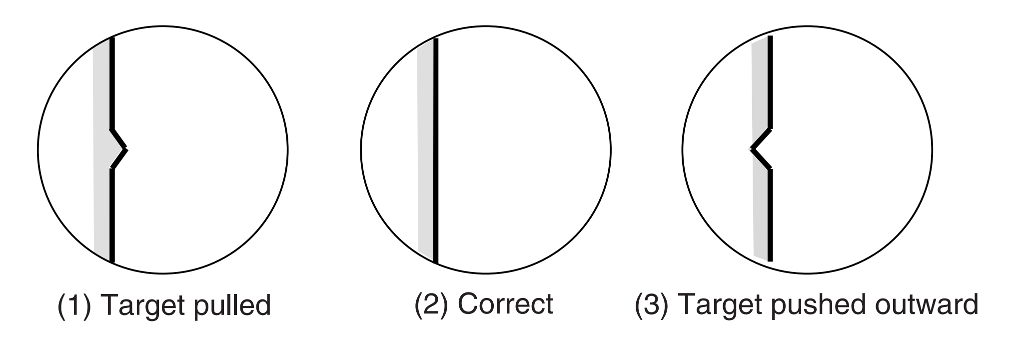
Tuning Initial Adjust

1. Transmit the radar at 48 nm range.
2. Open the Installation menu, and choose Tuning Initial Adjust.
3. Press the **ENTER** key to show the setting window.
4. Rotate the trackball to choose **Yes**, and then press the **ENTER** key. The tune adjustment begins, indicating "Tuning adjusting…." After the adjustment is completed, the window disappears.

Manual Timing Adjust

This adjustment ensures proper radar performance, especially on short ranges. The radar measures the time required for a transmitted echo to travel to the target and return to the source. The received echo appears on the display based on this time. Thus, at the instant the transmitter is fired, the sweep should start from the center of the display (sometimes called sweep origin.)

A trigger pulse generated in the display unit goes to the antenna unit through the signal cable to trigger the transmitter (magnetron). The time taken by the signal to travel up to the antenna unit varies, depending largely on the length of signal cable. During this period the display unit should wait before starting the sweep. When the display unit is not adjusted correctly, the echoes from a straight local object (for example, a harbor wall or straight pier) will not appear with straight edges – namely, they will be seen as “pushed out” or “pulled in” near the picture center. The range of objects will also be incorrectly shown.



Examples of improper and correct sweep timing

1. Transmit on the shortest range and confirm that gain and A/C SEA are properly adjusted.
2. Visually select a target which forms a straight line (harbor wall, straight piers).
3. Open the Installation menu and choose Manual Timing Adjust.
4. Press the **ENTER** key to show the setting window.
5. Rotate the trackball to straighten the target selected at step 2, and then press the **ENTER** key to finish.

Manual MBS Adjust

Main bang (black hole), which appears at the display center on short ranges, can be suppressed as follows.

1. Transmit the radar on the short range.
2. Open the Installation menu and choose Manual MBS Adjust.
3. Press the **ENTER** key to show the setting window.
4. Rotate the trackball to suppress main bang (between 0 and 255).
5. Press the **ENTER** key to finish.

Video Initial Adjust

After completing Auto Installation Setup, you can fine tune the video signal.

1. Transmit the radar and set as follows.
   Gain: one o'clock   A/C Sea: zero   A/C Rain: zero
   Echo Average: Off   Noise Rejecter: Off   Interference Rejecter: Med.
2. Open the Installation menu and choose Video Initial Adjust.
3. Press the **ENTER** key to show the setting window.
4. Rotate the trackball to adjust the video so that the white noise slightly appears. The setting range is 0 to 31. The greater the value, the higher the gain.
5. Press the **ENTER** key to finish.

Note: If the display unit is used as a Sub-display, set the "Input Source" to "Sub" and perform the Video Initial Adjust as mentioned above so that the echo presentation on the sub-display is the same as that on the main display.

4. OPTIONAL EQUIPMENT

4.1 ARP Kit ARP-11

The ARP kit provides automatic radar plotter functions to this radar.

Necessary parts

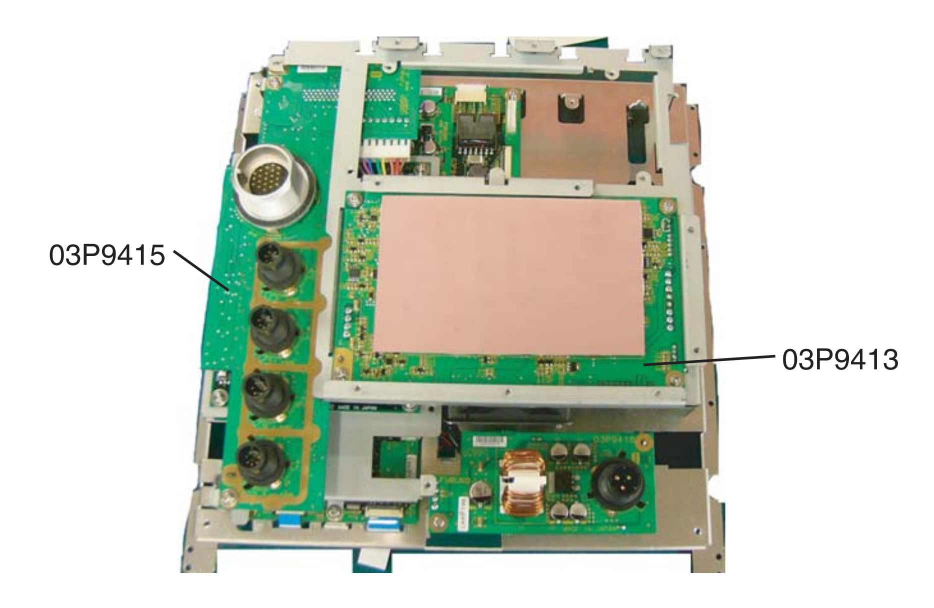
Name: ARP kit
Type: ARP-11
Code no.: 008-523-050

Contents of ARP kit

Name	Type	Code No.	Qty
ARP Board	18P9013	008-559-080	1
Pan head screw	M3x6 C2700W	000-163-189-10	4
Spacer*	SQ9	000-159-320-10	1
	SQ15	000-159-299-10	3
Spring washer*	M3 C5191W	000-864-204	3

*Not used

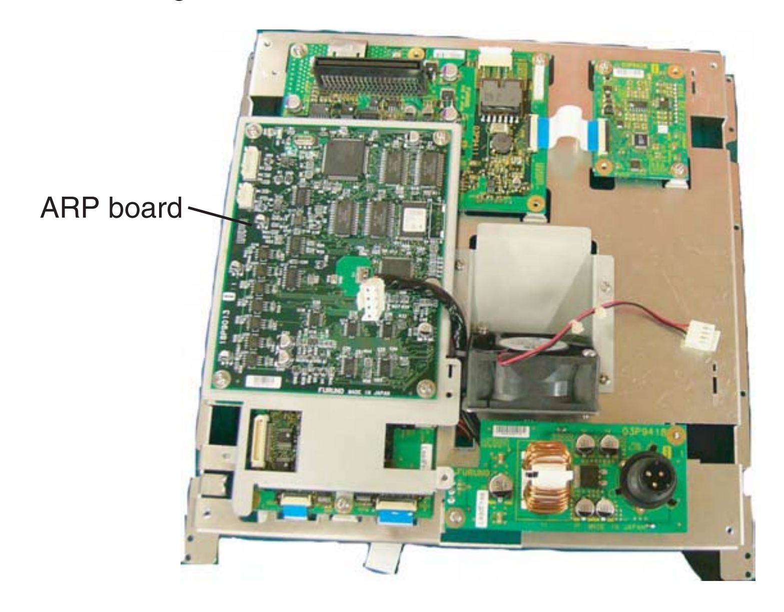
1. Unscrew all connector nuts at the rear of the display unit.
2. Unfasten all screws to remove the display cover.



Removing the display unit cover

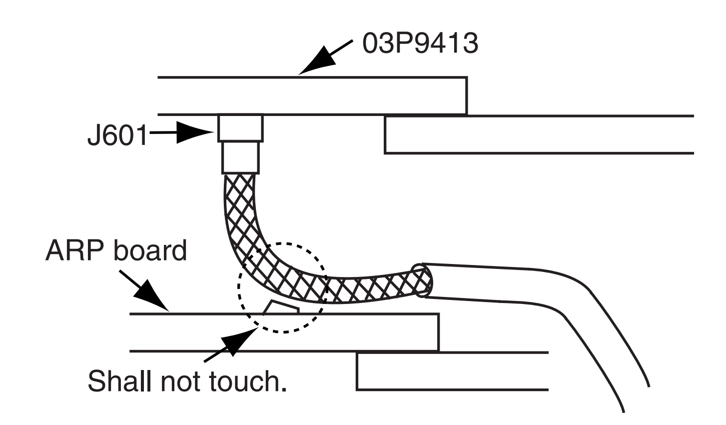
3. Disconnect the printed circuit board 03P9415 and 03P9413.
   Before disconnecting the 03P9413, disconnect J601 and J604 at the back of the board.

4. Mount the ARP board, mating with connectors and fixing it with four screws at the location as shown in the figure below.



5. Remount 03P9415 and 03P9413 at original position and display cover.

Note: After connecting the harness to J601 on 03P9413, bend the harness so that it does not touch the parts on ARP board.



4.2 External Monitor

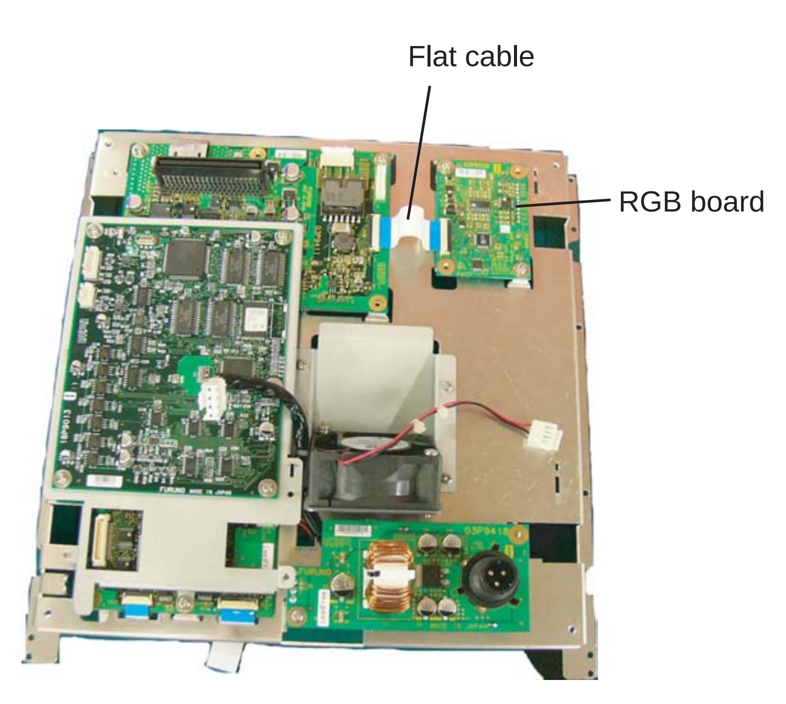
You can display the radar image on an external monitor which accepts industrial standard VGA input using the optional RGB kit OP03-195. Supply monitor and interconnection cable (with HD-15P connectors of male, three rows of 15 pins) locally.

Necessary parts for external monitor

Name: RGB kit
Type: OP03-195
Code No.: 008-553-110

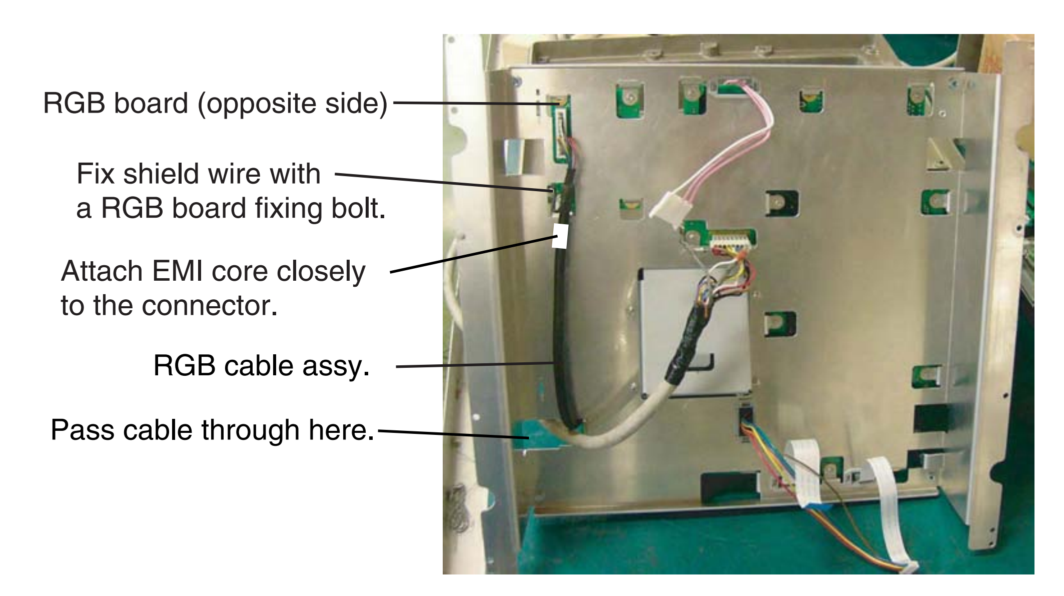
Name	Type	Code No.	Qty
RGB board	03P9492	008-553-680	1
Flat cable	SML2SC34-4X50BDP.5S4	000-155-457	1
Cable assy	15SDS/XHP10-005	000-144-511	1
EMI core	RFC-6	000-144-132-10	1

1. Unscrew all connector nuts at the rear of the display unit.
2. Unfasten all screws to remove the display cover.
3. Disconnect the printed circuit board 03P9415 and 03P9413.
   Before disconnecting the 03P9413, disconnect J601 and J604 at the back of the board.
4. Mount the RGB board with two screws and connect the flat cable at the location shown in the figure below.



5. Remount 03P9415 and 03P9413 at their original locations and display cover.

6. Detach LCD panel from the above assembly. Be sure to disconnect the connector and flat cables.
7. Connect the cable assy. 15SDS/XHP10-005 to the rear side of the RGB board.
8. Fix the shield wire of the cable assy. with a screw used to fix the RGB board.
9. Attach the EMI core RFC-1 to the cable assy. closely to the connector.
10. Pass the signal cable through the hole shown below and then pass it through the "OPTION" port at the rear of the display unit..



11. Reassemble the display unit and cover the hole with soft putty to seal.
12. Fix the EMI core RFC-6 to the cable closely to the display unit.

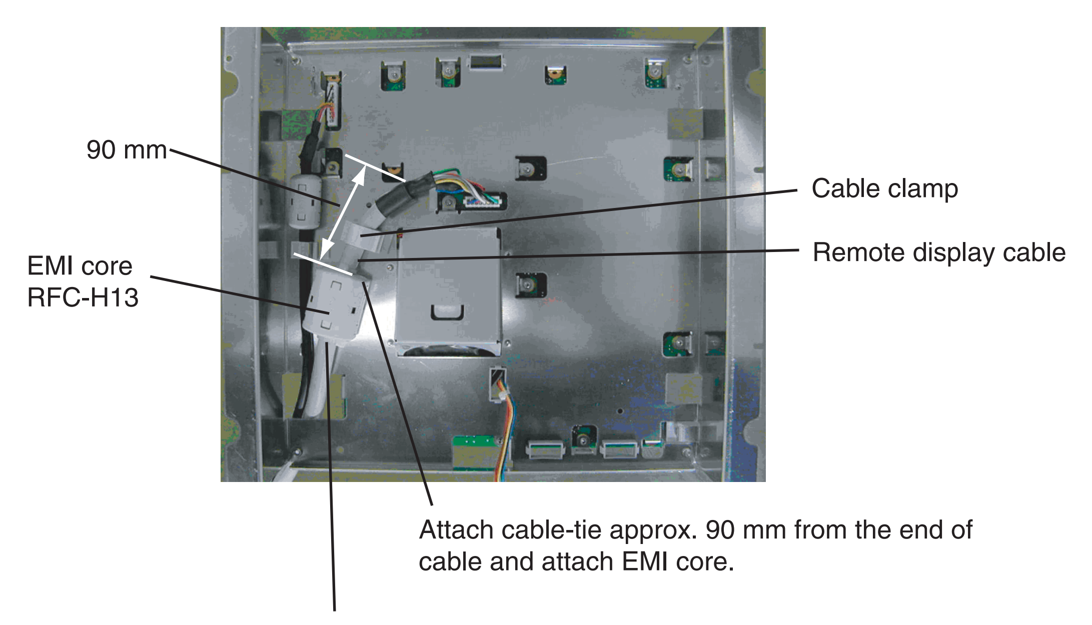
4.3 Remote Display

The FURUNO Display Unit FMD-811, MODEL1832 or GD-280/380, etc. can be connected to this radar as a sub display. The display unit RDP-150 also can be used as a sub display. To interconnect them, use optional cable MJ-B24LPF0008-100/200/300 (see page iv). Also, the EMI core (option) should be attached to the remote display cable to prevent noise.

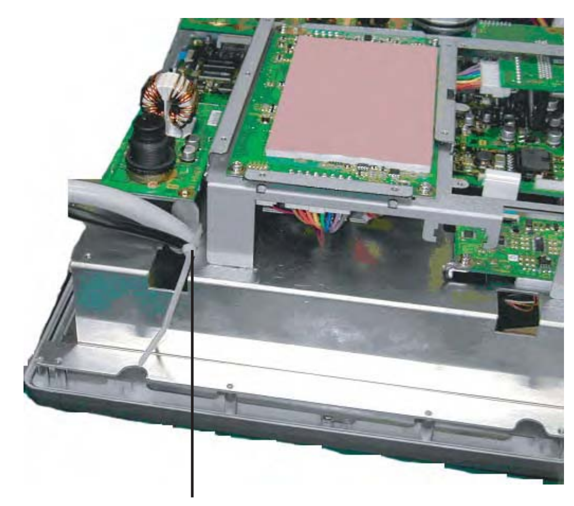
Installation materials for remote display (Type: CP03-31001、Code number: 008-556-830)

	Name	Type	Code no.	Qty
1	EMI core	RFC-H13	000-146-570-10	1
2	Cable clamp	CK-13H	000-102-947-10	1
3	Cable-tie	CV-100N	000-162-167-10	2
4	Cable-tie	CV-150N	000-162-186-10	1

1. Unscrew all connector nuts at the rear of the main display unit.
2. Unfasten all screws to remove the display cover.
3. Pass the signal cable from the “OPTION” port at the rear of the display unit through the hole shown in the figure below and then connect it to the SPU board.
4. Fix the shield wire with a screw used to fixed the SPU board.
5. Attach the EMI core RFC-H13 on the signal cable.
6. Attach cable clamp and fix the cable as shown below.



7. Fix the signal cable to the spacer of the FIL board with a cable tie CV-150N.



8. Reassemble the display unit.

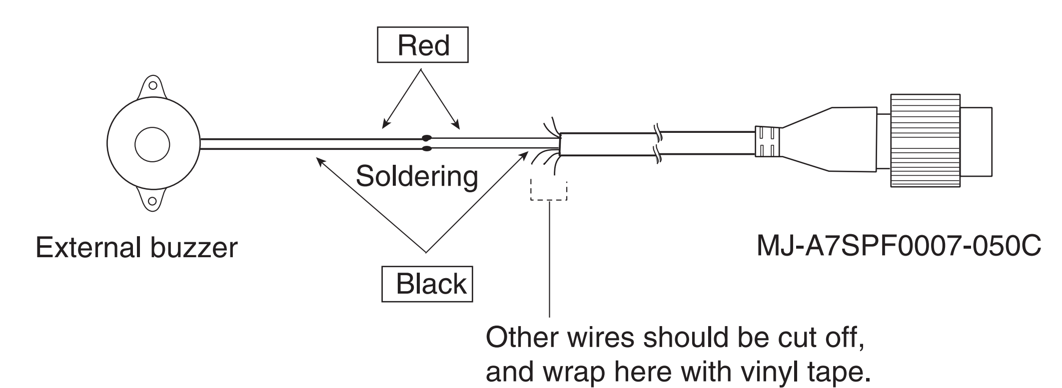
4.4 External Buzzer

The optional external buzzer provides a louder alert when an alarm is violated.

External buzzer
Type: OP03-136
Code no.: 000-086-443

Further, you need the optional cable assy. MJ-A7SPF0007-050C (w/7P connector, 5 m, code no. 000-154-028-10).

1. Attach the MJ-A7SPF0007-050C cable assy. (option) to the PC/EXT-BUZZER port at the rear of the display unit.
2. Cut off the XH connector and cable itself (as necessary) at the end of the external buzzer cable.
3. Solder the cables made at step 2 to the MJ-A7SPF0007-050C cable as shown below.



Connection of external buzzer and display unit using cable assy. type MJ-A7SPF0007-050C cable

4. Attach the buzzer to the mounting location with double-sided tape or two self-tapping screws (3x15 or 3x20, local supply).

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PACKING LIST RDP-150-J/E

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
指示部 DISPLAY UNIT	321 / 345	RDP-150-J/E 000-090-462-00 **	1
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP03-15401 008-553-040-00	1
工事材料 INSTALLATION MATERIALS		CP03-30900	
工事材料 INSTALLATION MATERIALS		CP03-30901 008-553-050-00	1
工事材料 INSTALLATION MATERIALS		CP03-30902 008-554-600-00	1
ｹｰﾌﾞﾙ組品MJ CABLE ASSY.	L=5M	MJ-A3SPF0018-050ZC 000-154-025-10	1
図書 DOCUMENT			
ﾌﾗｯｼｭﾏｳﾝﾄﾖｳ型紙 FLUSH MOUNTING TEMPLATE	420 / 297	C32-00601-* 000-161-509-1*	1
技適認証要領 APPLICATION GUIDE	210 / 297	J32-00501-* 000-153-768-1*	1 (*1)

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
操作要領書 OPERATOR'S GUIDE	210 / 297	OS*-35390-* 000-153-319-1* **	1
装備要領書 INSTALLATION MANUAL	210 / 297	IM*-35390-* 000-153-317-1* **	1
取扱説明書 OPERATOR'S MANUAL	210 / 297	OM*-35390-* 000-153-315-1* **	1
ﾋｭｰｽﾞ変更のお願い NOTICE FOR FUSE REPLACEMENT	210 / 297	C32-00504-* 000-153-329-1*	1

ｺｰﾄﾞ番号末尾の[**]は、選択品の代表ｺｰﾄﾞを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

(*1)の書類は、和文仕様専用
(*1) MARKED DOCUMENTS ARE FOR JAPANESE SET ONLY.

(略図の寸法は、参考値です。DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

型式/ｺｰﾄﾞ番号が2段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。
TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

PACKING LIST

03GT-X-9852 -0 1/1

RSB-0070-085/RSB-0073-085/RSB-0073-086/RSB-0073-087

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線本体部 ANTENNA UNIT	438	RSB-0070-085 008-552-970 **	1
工事材料 INSTALLATION MATERIALS			
空中線部工材 ANTENNA INSTALLATION MATERIALS		CP03-30801 008-552-960	1

ｺｰﾄﾞ番号末尾の[**]は、選択品の代表ｺｰﾄﾞを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

PACKING LIST

19AK-X-9856 -5 1/1

XN10A, XN12A, XN13A

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
ｱﾝﾃﾅ ANTENNA	L L=1036(XN10A), 1255(XN12A), 1795(XN13A)	XN10A/12A/13A 008-390-960 **	1
ｱﾝﾃﾅ工材 ANTENNA INSTALLATION MATERIALS			
Oﾘﾝｸﾞ O-RING	φ80	JB1AG-80 000-851-313	1
ｹﾐｼｰﾙ SILICON RUBBER	135	S-8400W ｱﾙﾐﾁｭｰﾌﾞ 50G 000-158-483	1
六角ﾎﾞﾙﾄ ｽﾘﾜﾘ HEX. BOLT	30 φ8	M8X30 SUS304 000-862-151	4
ﾐｶﾞｷ平座金 FLAT WASHER	φ17	M8 SUS304 000-864-130	4
バネ座金 SPRING WASHER	15	M8 SUS304 000-864-262	4

ｺｰﾄﾞ番号末尾の[**]は、選択品の代表ｺｰﾄﾞを表します。
CODE NUMBER ENDING WITH "**" INDICATES THE CODE NUMBER OF REPRESENTATIVE MATERIAL.

(略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.)

FURUNO

CODE NO.	008-552-960-00	03GT-X-9401 -6
TYPE	CP03-30801	1/2

工事材料表
INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	ｼｰﾙﾜｯｼｬ SEAL WASHER	φ30	03-001-3002-0 CODE NO. 300-130-020-00	4	
2	防蝕ゴム CORROSION-PROOF RUBBER MAT	256, 256	03-142-3001-0 CODE NO. 100-275-580-00	1	
3	ﾊﾟｯｷﾝｵｻｴ GASKET SUPPORT	69, 49	03-167-2017-0 CODE NO. 100-327-760-00	1	
4	ｼｰﾙﾄﾞｸﾗﾝﾌﾟ SHIELD CLAMP	13, 38	03-167-2018-1 CODE NO. 100-327-771-00	1	
5	ｷｬｯﾌﾟ CAP	φ17, 4.4	040-4010 040-4010 CODE NO. 000-164-929-10 000-515-332-00	4	
6	六角ﾅｯﾄ　１種 HEX.NUT	10, 19	M12 SUS304 CODE NO. 000-863-112-00	4	
7	ﾐｶﾞｷ平座金 FLAT WASHER	φ24	M12 SUS304 CODE NO. 000-864-132-00	4	
8	ﾊﾞﾈ座金 SPRING WASHER	22	M12 SUS304 CODE NO. 000-864-263-00	4	
9	六角ﾎﾞﾙﾄ（全ﾈｼﾞ） HEX. BOLT	60, φ12	M12X60 SUS304 M12X60 SUS304 CODE NO. 000-162-813-10 000-862-191-00	4	
10	+-ﾅﾍﾞｾﾑｽﾈｼﾞB WASHER HEAD SCREW	15, φ4	M4X15 C2700W MBNI2 CODE NO. 000-881-448-00	2	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	008-552-960-00	03GT-X-9401 -6
TYPE	CP03-30801	2/2

工事材料表
INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
11	六角ﾅｯﾄ　１種 HEX.NUT	5, 10	M6 SUS304 M6 SUS304 CODE NO. 000-158-856-10 000-863-109-00	1	
12	ﾐｶﾞｷ平座金 FLAT WASHER	φ13	M6 SUS304 M6 SUS304 CODE NO. 000-158-854-10 000-864-129-00	3	
13	ﾊﾞﾈ座金 SPRING WASHER	12	M6 SUS304 M6 SUS304 CODE NO. 000-158-855-10 000-864-260-00	1	
14	六角ﾎﾞﾙﾄ HEX.BOLT	25, φ6	M6X25 SUS304 M6X25 SUS304 CODE NO. 000-162-871-10 000-862-180-00	1	
15	EMIｺｱ EMI CORE	63, 34	RFC-13 CODE NO. 000-141-084-10	2	
16	EMIｺｱ EMI CORE	63, 41	RFC-H13 CODE NO. 000-146-570-10	1	
17	ｱｰｽ線 GROUNDING WIRE	340	RW-4747-1 03S4747-2 CODE NO. 000-566-000-01	1	

型式/ｺｰﾄﾞ番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。　なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

（略図の寸法は、参考値です。　DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	008-553-050-00	03GT-X-9402 -3
TYPE	CP03-30901	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	防振ゴム(1) RUBBER CUSHION	92 / 93	03-167-1403-3 CODE NO. 100-329-823-10	1	
2	防振ゴム(2) RUBBER CUSHION(2)	92 / 93	03-167-1404-1 CODE NO. 100-337-751-10	1	
3	+トラスタッピンネジ 1シュ SELF-TAPPING SCREW	20 / φ5	5X20 SUS304 5X20 SUS304 CODE NO. 000-162-608-10 000-802-081-00	4	
4	冷間圧造蝶ナット WING NUT	22 / 10.5	M4 SUS304 CODE NO. 000-863-331-00	4	
5	ミガキ平座金 FLAT WASHER	φ9	M4 SUS304 CODE NO. 000-864-126-00	4	
6	バネ座金 SPRING WASHER	8	M4 SUS304 CODE NO. 000-864-256-00	4	
7	寸切ボルト THREADED ROD	50 / φ4	M4X50 SUS304 M4X50 SUS304 CODE NO. 000-162-679-10 000-147-539-00	4	

型式/コード番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.	008-554-600-00	03GT-X-9405 -2
TYPE	CP03-30902	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	Fマウントヨウスポンジ FLUSH MOUNTING SPONGE	308 / 308	03-167-1601-0 CODE NO. 100-328-390-00	1	

型式/コード番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.		03GT-X-9403 -0
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

FR-8062/8122

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
1	ケーブル組品MJ CABLE ASSY.	L=30	MJ-B24LPF0012-300		1	選択 TO BE SELECT
			CODE NO.	000-153-622		
2	ケーブル組品MJ CABLE ASSY.	L=20	MJ-B24LPF0012-200		1	選択 TO BE SELECT
			CODE NO.	000-153-621		
3	ケーブル組品MJ CABLE ASSY.	L=15	MJ-B24LPF0012-150		1	選択 TO BE SELECT
			CODE NO.	000-153-620		
4	ケーブル組品MJ CABLE ASSY.	L=10	MJ-B24LPF0012-100		1	選択 TO BE SELECT
			CODE NO.	000-153-619		

03GT-X-9403

FURUNO ELECTRIC CO., LTD.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO

CODE NO.		19AV-X-9402 -0
TYPE		1/1

工事材料表

INSTALLATION MATERIALS

FR-8252

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS		数量 Q'TY	用途／備考 REMARKS
1	ケーブル組品 CABLE ASSY.	L=30M	RW-9771 *30M*		1	選択 TO BE SELECTED
			CODE NO.	000-152-869		
2	ケーブル組品 CABLE ASSY.	L=20M	RW-9771 *20M*		1	選択 TO BE SELECTED
			CODE NO.	000-152-868		
3	ケーブル組品 CABLE ASSY.	L=15M	RW-9771 *15M*		1	選択 TO BE SELECTED
			CODE NO.	000-152-867		
4	ケーブル組品 CABLE ASSY.	L=10M	RW-9771 *10M*		1	選択 TO BE SELECTED
			CODE NO.	000-152-866		

19AV-X-9402

FURUNO ELECTRIC CO., LTD.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

PACKING LIST

19AV-X-9855 -2 1/1

PSU-008

NAME	OUTLINE	DESCRIPTION/CODE No.	Q'TY
ユニット UNIT			
空中線電源部 POWER SUPPLY UNIT	288 × 239	PSU-008 000-083-617	1
予備品 SPARE PARTS			
予備品 SPARE PARTS		SP03-14501 008-444-420	1
工事材料 INSTALLATION MATERIALS		**CP03-30600**	
ケーブル組品 CABLE ASSY.	L=5M	VL3P-VV-S2X2C-AA050 000-152-217	1
ケーブル組品MJ CABLE ASSY	L=5M	MJ-B24LPF0011-050 000-152-939	1
工事材料 INSTALLATION MATERIALS		CP03-30601 008-550-740	1
図書 DOCUMENT			
設定要領書 INTERNAL SETTING(JR/EN)	210 × 297	C32-00505-* 000-153-867	1
ヒューズ変更のお願い NOTICE FOR FUSE REPLACEMENT	210 × 297	C32-00502-* 000-152-940	1

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

19AV-X-9855

FURUNO

CODE NO.	008-550-740-00	19AV-X-9401 -2
TYPE	CP03-30601	1/1

工事材料表

INSTALLATION MATERIALS

番号 NO.	名称 NAME	略図 OUTLINE	型名／規格 DESCRIPTIONS	数量 Q'TY	用途／備考 REMARKS
1	+トラスタッピンネジ 1シュ SELF-TAPPING SCREW	20, φ5	5X20 SUS304 CODE NO. 000-162-608-10	4	
2	コネクタ組品 CONNECTOR ASSY.	8, 4	XH2P-L40-ACR CODE NO. 000-153-879-10	1	

型式/コード番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

FURUNO ELECTRIC CO ., LTD.

19AV-X-9401

FURUNO

CODE NO.	008-553-040-00	03GT-X-9301 -1 1/1
TYPE	SP03-15401	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	SPARE	REMARKS/CODE NO.
1	ヒューズ FUSE	30, φ6	FGBO 125V 10A PBF FGBO 10A AC125V			3	000-155-826-10 000-549-065-00
2	ヒューズ FUSE	30, φ6	FGBO 125V 15A PBF FGBO 15A AC125V			3	000-155-827-10 000-549-014-00

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	03GT-X-9301	1/1

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

型式/コード番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

FURUNO

CODE NO.	008-444-420	19AQ-X-9301 -2 1/1
TYPE	SP03-14501	BOX NO. P

SHIP NO.	SPARE PARTS LIST FOR	U S E	SETS PER VESSEL

ITEM NO.	NAME OF PART	OUTLINE	DWG. NO. OR TYPE NO.	QUANTITY WORKING PER SET	QUANTITY WORKING PER VES	SPARE	REMARKS/CODE NO.
1	ヒューズ FUSE	30, φ6	FGBO 125V 15A PBF FGBO 15A AC125V			3	000-155-827-10 000-549-014-00
2	ヒューズ FUSE	30, φ6	FGBO 125V 7A PBF FGBO 7A AC125V			3	000-155-831-10 000-549-013-00
3	カンイリヒューズ FUSE	30, φ6	FGBO 125V 3A PBF FGBO 3A AC125V			3	000-155-830-10 000-131-845-00

MFR'S NAME	FURUNO ELECTRIC CO.,LTD.	DWG NO.	19AQ-X-9301	1/1

（略図の寸法は、参考値です。 DIMENSIONS IN DRAWING FOR REFERENCE ONLY.）

型式/コード番号が２段の場合、下段より上段に代わる過渡期品であり、どちらかが入っています。 なお、品質は変わりません。

TWO TYPES AND CODES MAY BE LISTED FOR AN ITEM. THE LOWER PRODUCT MAY BE SHIPPED IN PLACE OF THE UPPER PRODUCT. QUALITY IS THE SAME.

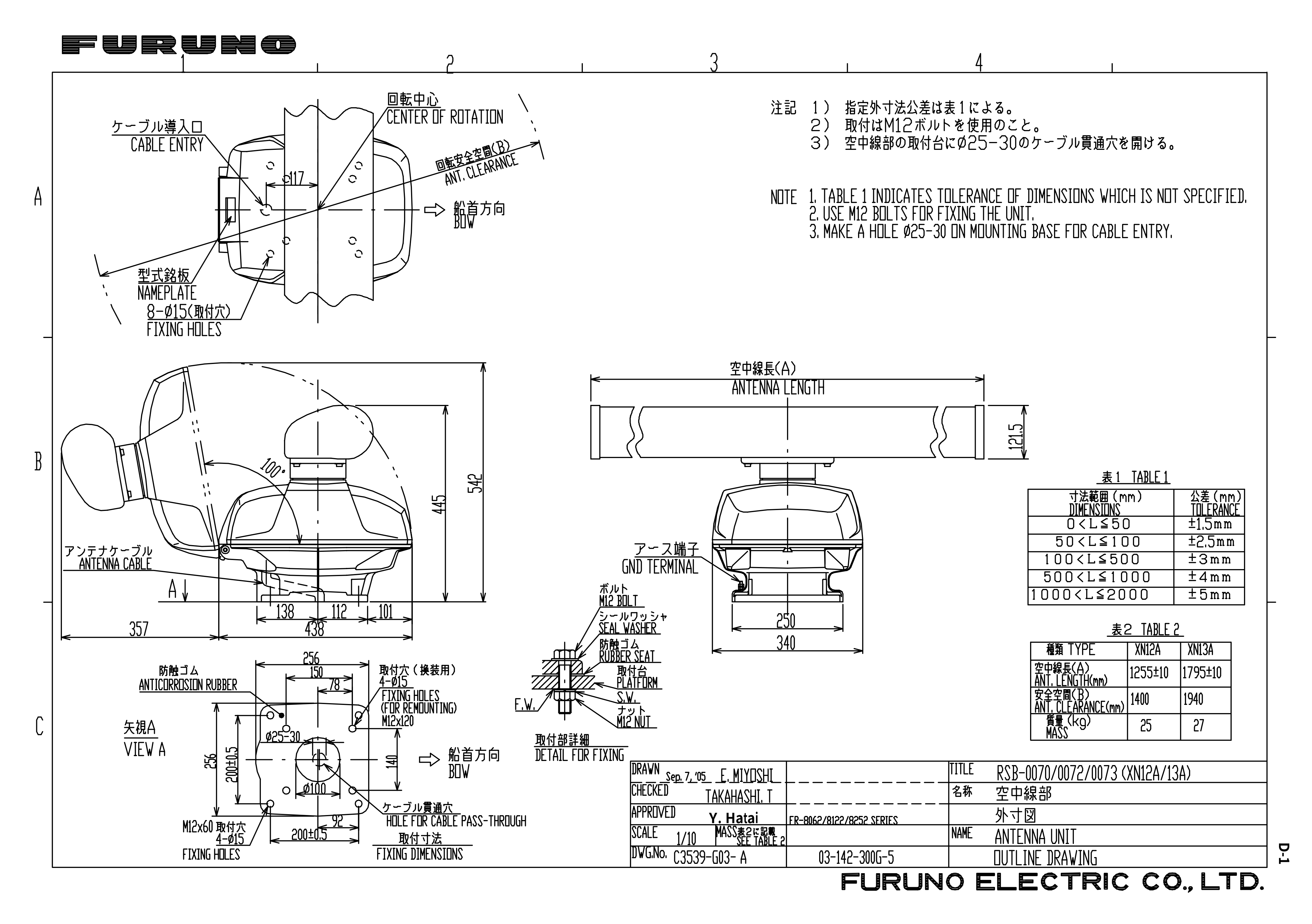


表1 TABLE 1

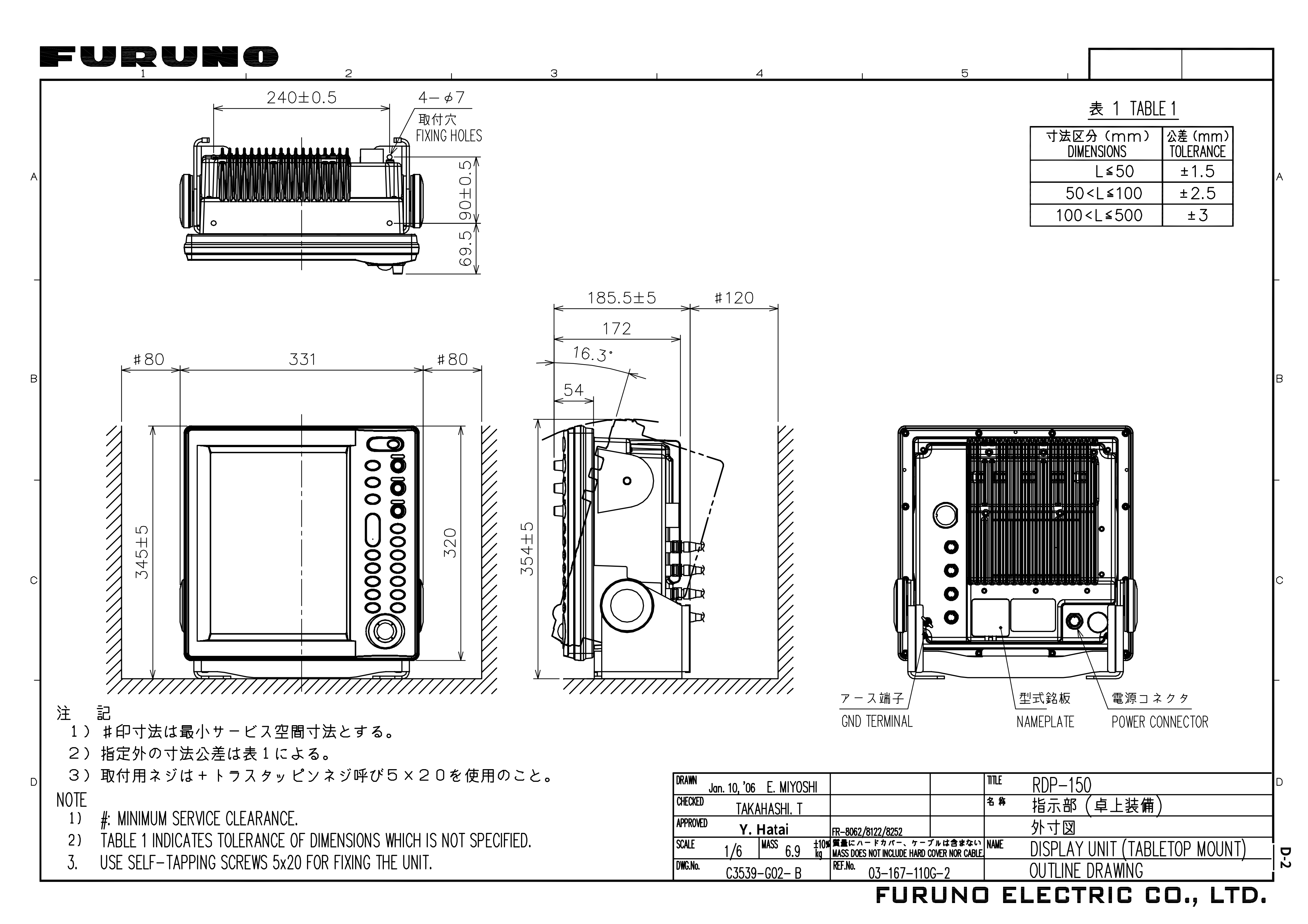
寸法範囲 (mm) DIMENSIONS	公差 (mm) TOLERANCE
0＜L≦50	±1.5mm
50＜L≦100	±2.5mm
100＜L≦500	±3mm
500＜L≦1000	±4mm
1000＜L≦2000	±5mm

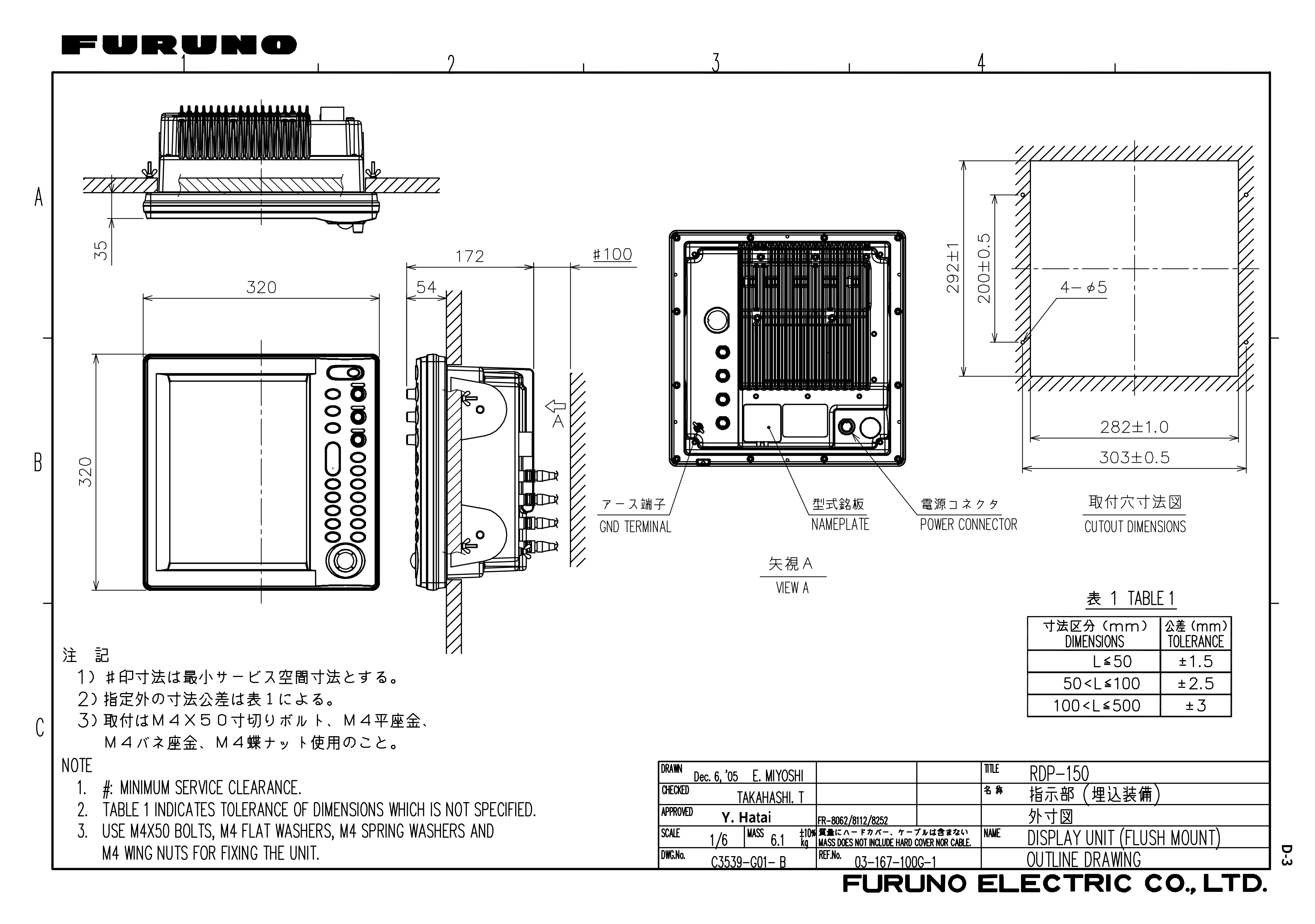
表2 TABLE 2

種類 TYPE	XN12A	XN13A
空中線長(A) ANT. LENGTH(mm)	1255±10	1795±10
安全空間(B) ANT. CLEARANCE(mm)	1400	1940
質量(kg) MASS	25	27

DRAWN Sep. 7, '05 E. MIYOSHI		TITLE	RSB-0070/0072/0073 (XN12A/13A)
CHECKED TAKAHASHI. T		名称	空中線部
APPROVED Y. Hatai	FR-8062/8122/8252 SERIES		外寸図
SCALE 1/10	MASS 表2に記載 SEE TABLE 2	NAME	ANTENNA UNIT
DWG.No. C3539-G03- A	03-142-300G-5		OUTLINE DRAWING

FURUNO ELECTRIC CO., LTD.


FURUNO
240±0.5
4−φ7
取付穴
FIXING HOLES
90±0.5
69.5
表 1 TABLE 1
寸法区分（mm） DIMENSIONS | 公差（mm） TOLERANCE
L≦50 | ±1.5
50<L≦100 | ±2.5
100<L≦500 | ±3
#80
331
#80
345±5
320
185.5±5
#120
172
16.3°
54
354±5
アース端子
GND TERMINAL
型式銘板
NAMEPLATE
電源コネクタ
POWER CONNECTOR
注　記
1）＃印寸法は最小サービス空間寸法とする。
2）指定外の寸法公差は表１による。
3）取付用ネジは＋トラスタッピンネジ呼び５×２０を使用のこと。
NOTE
1) #: MINIMUM SERVICE CLEARANCE.
2) TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 5x20 FOR FIXING THE UNIT.
DRAWN Jan. 10, '06 E. MIYOSHI
CHECKED TAKAHASHI. T
APPROVED Y. Hatai
SCALE 1/6
MASS 6.9 ±10% kg
FR-8062/8122/8252
質量にハードカバー、ケーブルは含まない
MASS DOES NOT INCLUDE HARD COVER NOR CABLE.
DWG.No. C3539-G02- B
REF.No. 03-167-110G-2
TITLE RDP-150
名称 指示部（卓上装備）
外寸図
NAME DISPLAY UNIT (TABLETOP MOUNT)
OUTLINE DRAWING
FURUNO ELECTRIC CO., LTD.
D-2


FURUNO
1
2
3
4
A
B
C
35
320
320
172
54
#100
A
292±1
200±0.5
4－φ5
282±1.0
303±0.5
アース端子
GND TERMINAL
型式銘板
NAMEPLATE
電源コネクタ
POWER CONNECTOR
取付穴寸法図
CUTOUT DIMENSIONS
矢視 A
VIEW A
表 1 TABLE 1
寸法区分 (mm) DIMENSIONS | 公差 (mm) TOLERANCE
L≦50 | ±1.5
50<L≦100 | ±2.5
100<L≦500 | ±3
注 記
1) #印寸法は最小サービス空間寸法とする。
2) 指定外の寸法公差は表1による。
3) 取付はM4X50寸切りボルト、M4平座金、M4バネ座金、M4蝶ナット使用のこと。
NOTE
1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE M4X50 BOLTS, M4 FLAT WASHERS, M4 SPRING WASHERS AND M4 WING NUTS FOR FIXING THE UNIT.
DRAWN Dec. 6, '05 E. MIYOSHI
CHECKED TAKAHASHI. T
APPROVED Y. Hatai
FR-8062/8112/8252
SCALE 1/6 MASS 6.1 ±10% kg
質量にハードカバー、ケーブルは含まない
MASS DOES NOT INCLUDE HARD COVER NOR CABLE.
DWG.No. C3539-G01- B
REF.No. 03-167-100G-1
TITLE RDP-150
名称 指示部 (埋込装備)
外寸図
NAME DISPLAY UNIT (FLUSH MOUNT)
OUTLINE DRAWING
FURUNO ELECTRIC CO., LTD.

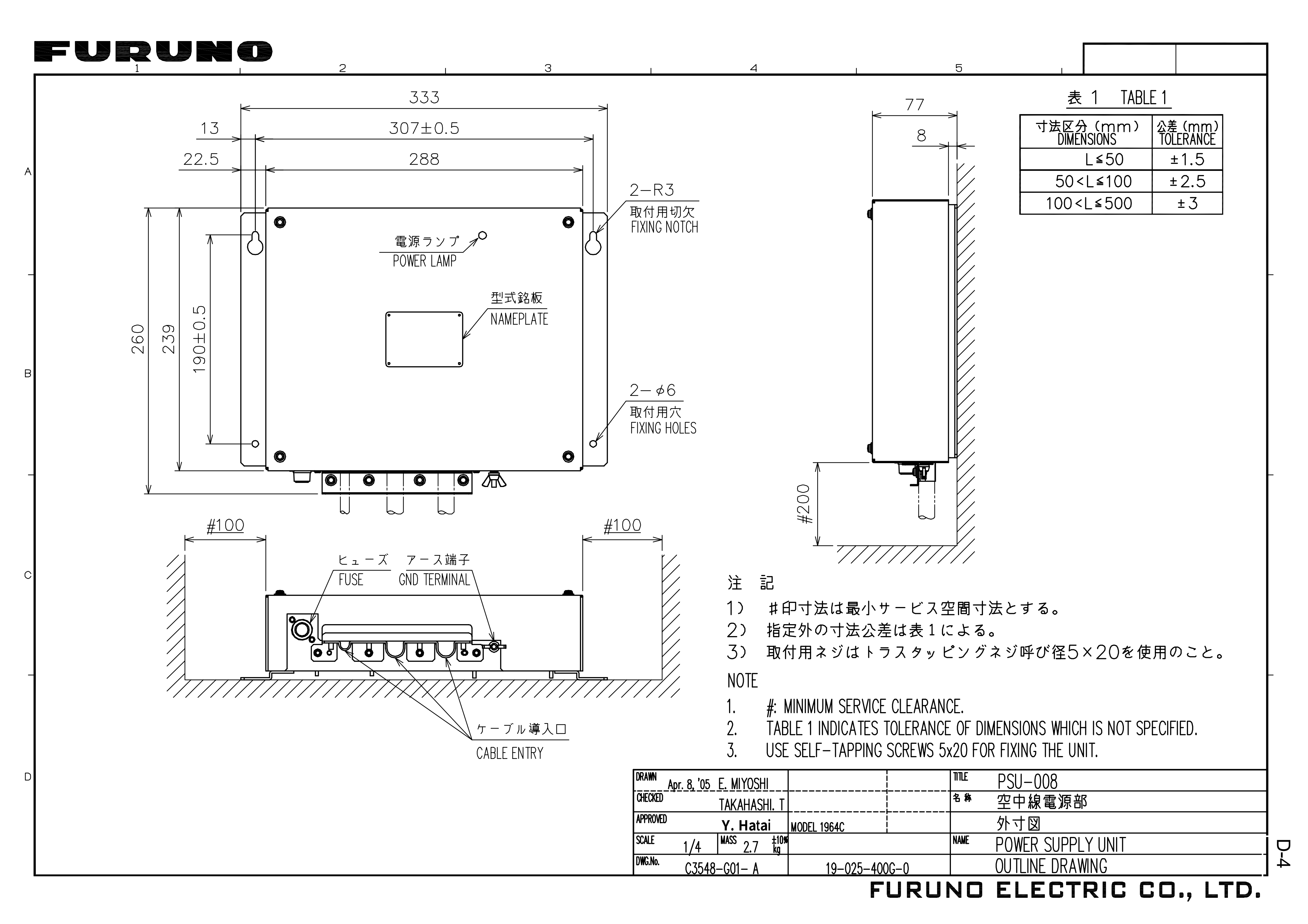


表 1 TABLE 1

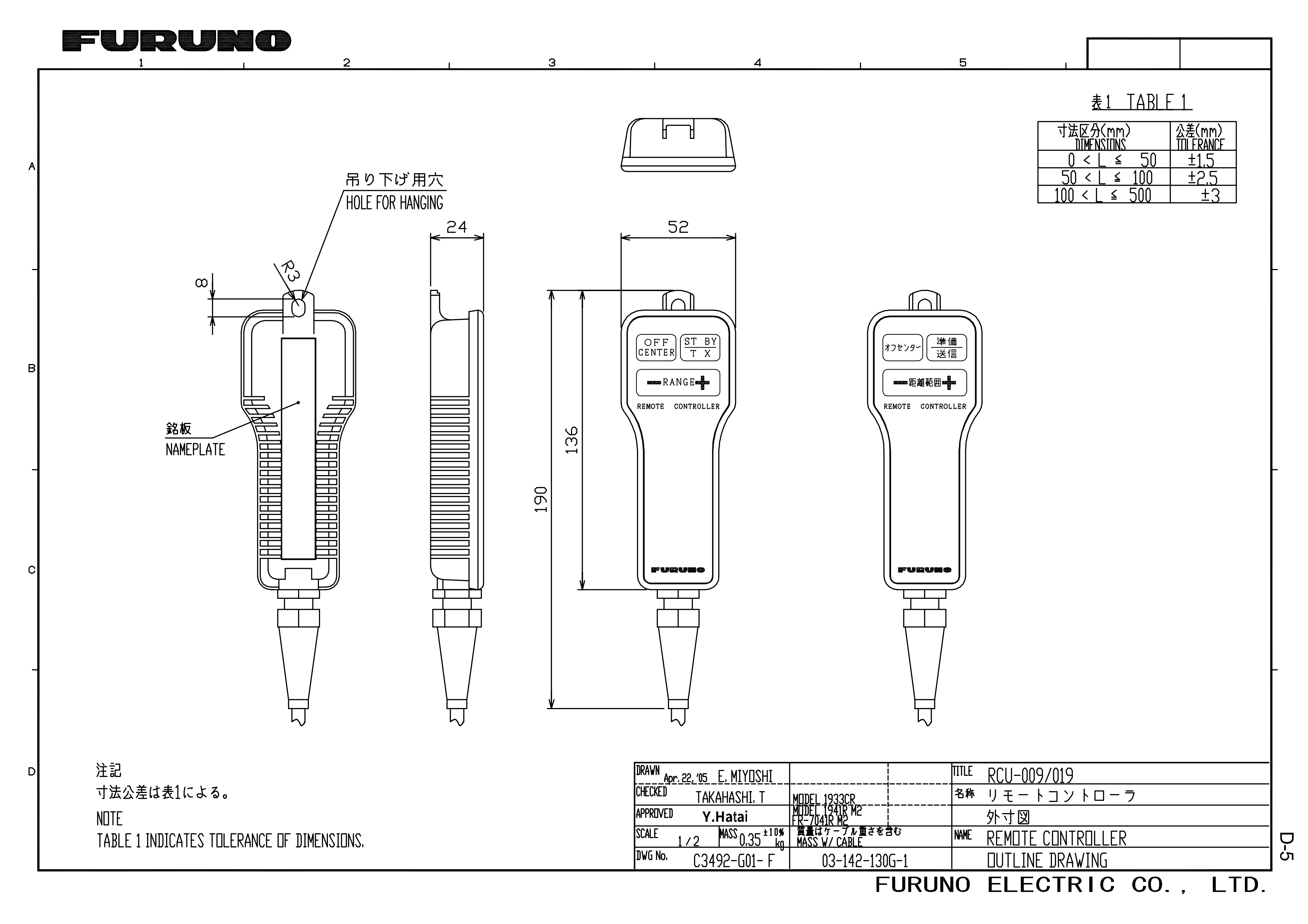
寸法区分（mm） DIMENSIONS	公差（mm） TOLERANCE
L≦50	±1.5
50＜L≦100	±2.5
100＜L≦500	±3

注　記

1）　＃印寸法は最小サービス空間寸法とする。
2）　指定外の寸法公差は表１による。
3）　取付用ネジはトラスタッピングネジ呼び径5×20を使用のこと。

NOTE

1. #: MINIMUM SERVICE CLEARANCE.
2. TABLE 1 INDICATES TOLERANCE OF DIMENSIONS WHICH IS NOT SPECIFIED.
3. USE SELF-TAPPING SCREWS 5x20 FOR FIXING THE UNIT.


FURUNO
表1 TABLE 1
寸法区分(mm) DIMENSIONS
公差(mm) TOLERANCE
0 < L ≦ 50
±1.5
50 < L ≦ 100
±2.5
100 < L ≦ 500
±3
吊り下げ用穴
HOLE FOR HANGING
R3
8
24
52
136
190
銘板
NAMEPLATE
OFF CENTER
ST BY / T X
RANGE
REMOTE CONTROLLER
オフセンター
準備 / 送信
距離範囲
注記
寸法公差は表1による。
NOTE
TABLE 1 INDICATES TOLERANCE OF DIMENSIONS.
DRAWN Apr. 22, '05 E. MIYOSHI
CHECKED TAKAHASHI. T
APPROVED Y.Hatai
SCALE 1/2
MASS 0.35 ±10% kg
DWG No. C3492-G01- F
MODEL 1933CR
MODEL 1941R M2
FR-7041R M2
質量はケーブル重さを含む
MASS W/ CABLE
03-142-130G-1
TITLE RCU-009/019
名称 リモートコントローラ
外寸図
NAME REMOTE CONTROLLER
OUTLINE DRAWING
FURUNO ELECTRIC CO., LTD.

FURUNO



指示部
DISPLAY UNIT
RDP-150

空中線部 ANTENNA UNIT
RSB-0070/RTR-085(24RPM):FR-8062
RSB-0073/RTR-085(48RPM):FR-8062
RSB-0073/RTR-086(24/48RPM):FR-8122

12-24 VDC — MJ-A3SPF0018-050ZC,5m,φ10 — 10A:24V / 15A:12V — MJ-A3SPFZ *4 — POWER: 1 (+), 2 (-), 3 GND

100/110/220/230VAC 50/60Hz,1φ — *1 DPYC-2.5 — 整流器 RECTIFIER RU-3423 24V *2 — *1 IV-2sq.

SVGAモニター SVGA MONITOR — *1 SVGA MONITOR CABLE — D-SUB 15P — 19S1004,0.5m *5 — J802 (RGB 03P9429): 1 R, 2 GND, 3 G, 4 GND, 5 B, 6 GND, 7 H_SYNC, 8 GND, 9 V_SYNC, 10 GND

副指示器 REMOTE DISPLAY — MJ-B24LPF0008-100/200/300, 10/20/30m,φ11.4 — *5 — J110:NH-8P (SPU 03P4911): 1 GND, 2 TRU_HD, 3 GND, 4 DP_BP, 5 GND, 6 PR_TRIG, 7 GND, 8 VIDEO

NMEA 入出力機器 DEVICE — MJ-A7SPF0007-050C, 5m,φ7 — MJ-A7SPF *4 — NMEA1: 1 TD1-A (シロ WHT), 2 TD1-B (アオ BLU), 3 RD1-H (キ YEL), 4 RD1-C (ミドリ GRN), 5 +12V (アカ RED), 6 SG (クロ BLK), 7 SHIELD

NMEA 入出力機器 DEVICE — MJ-A7SPF0007-050C, 5m,φ7 — MJ-A7SPF *4 — NMEA2: 1 TD2-A (シロ WHT), 2 TD2-B (アオ BLU), 3 RD2-H (キ YEL), 4 RD2-C (ミドリ GRN), 5 +12V (アカ RED), 6 SG (クロ BLK), 7 SHIELD

GYRO — ADコンバータ A-D CONVERTER AD-100 — MJ-A6SPF0003-050C,5m,φ6 (Straight cable)
選択 SELECT — ヘディングセンサ HEADING SENSOR PG-1000 — AD-10/NMEA — MJ-A6SPF0007-100 10m,φ6
MJ-A6SPF *4 — HDG: 1 DATA-H/HDG-H (シロ WHT), 2 DATA-C/HDG-C (クロ BLK), 3 CLK-H (キ YEL), 4 CLK-C (ミドリ GRN), 5 NC, 6 SHIELD

リモートコントローラ REMOTE CONTROLLER RCU-019 *2 — MJ-A7SPF0007-050C, 5m,φ7
外部ブザー EXT. BUZZER OP03-136 *2 — アカ RED, クロ BLK
MJ-A7SPF *4 — PC/EXT-BUZZER: 1 SD (シロ WHT), 2 RD (アオ BLU), 3 REMOTE-KEY (キ YEL), 4 NC (ミドリ GRN), 5 +12V (アカ RED), 6 EXT.BUZZ (クロ BLK), 7 SHIELD

*1 IV-2sq.

DJ-1 — MJ-B24LPF0012,10/15/20/30m,φ11 (RW-9807,21C+2C2V,30m MAX.) *4 — *5 3pcs — *4

DJ-1	色	COLOR	Connector	Pin	Signal
10	キ (太)	YEL(B)	J821 VH9P B9P-VH	1	+12V
11	クロ (太)	BLK(B)	J821	2	+12V
20	アカ (太)	RED(B)	J821	3	GND
14	シロ (太)	WHT(B)	J821	4	-12V
15	チャ (太)	BRN(B)	J821	5	-12V
2	チャ	BRN	J821	6	TX-TRIG.
8	アオ	BLU	J821	7	P/L-A
7	ミドリ	GRN	J821	8	P/L-B
			J821	9	NC
9	シロ	WHT	J823 VH4P B4P-VH	1	BP
1	アオ (太)	BLU(B)	J823	2	MOTOR+
17	クロ	BLK	J823	3	HD.
5	ムラサキ (太)	PPL(B)	J823	4	MOTOR-
18	ムラサキ	PPL	J824 NH13P	1	TUNE-IND.
22	キミドリ(太)	L-GRN(B)	J824	2	MOTOR-
			J824	3	NC
19	モモ (太)	PNK(B)	J824	4	MOTOR+
3	アカ	RED	J824	5	MBS-L
4	ハイ (太)	GRY(B)	J824	6	MOTOR+
			J824	7	NC
24	ダイ	ORG	J824	8	GND
			J824	9	NC
			J824	10	NC
21			J824	11	GND
16	ドウジク 2C2V	COAX.	J824	12	VIDEO
6	キ	YEL	J824	13	TUNE-CONT
13	ミドリ (太)	GRN(B)	J822 VH2P	1	-12
12	ダイ (太)	ORG(B)	J822	2	+12
23					

RTB 03P9405A

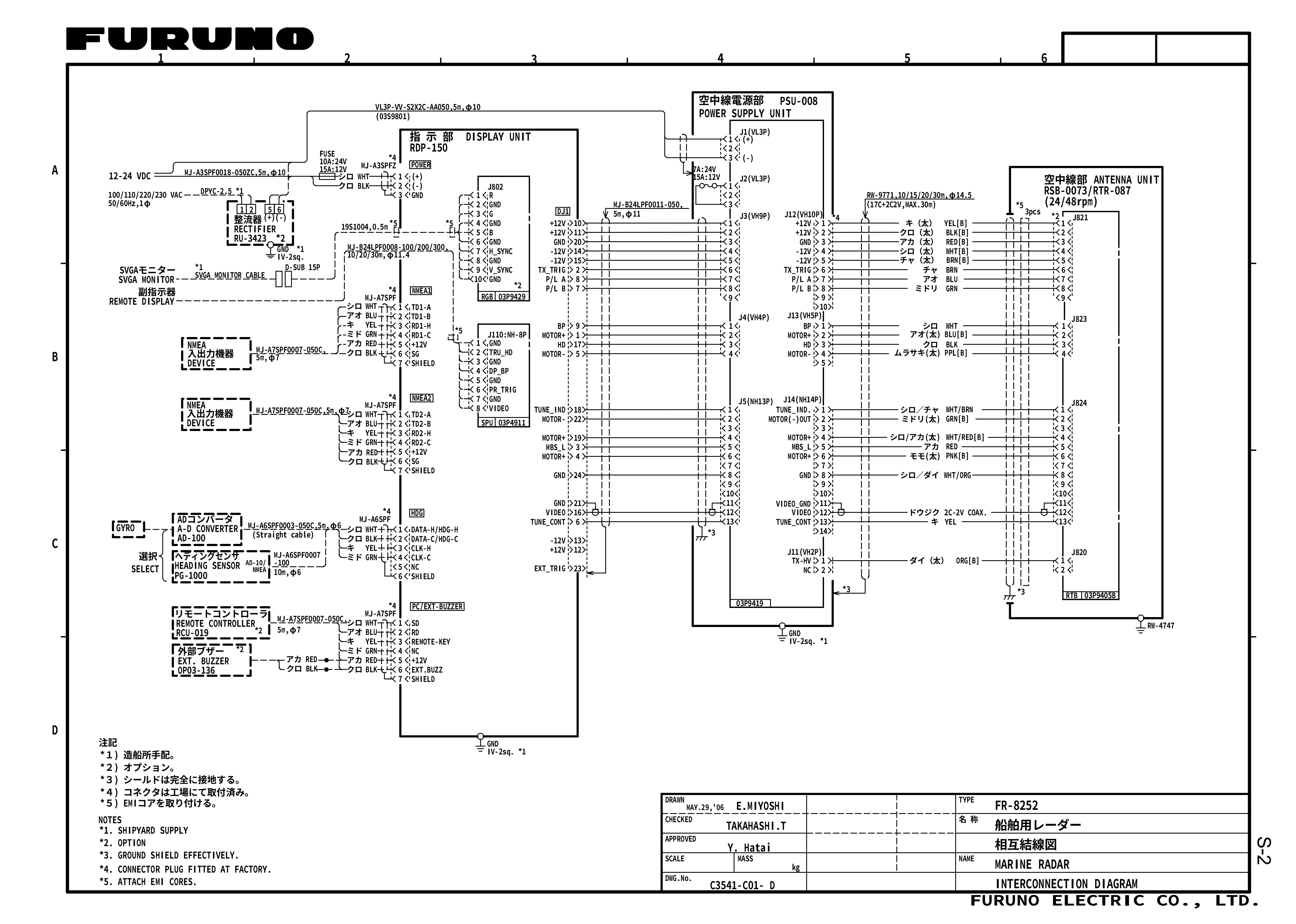
*3 — RW-4747

注記
*1) 造船所手配。
*2) オプション。
*3) シールドは両端で完全にアースする。
*4) コネクタは工場にて取付済み。
*5) ＥＭＩコアを取り付ける。

NOTES
*1. SHIPYARD SUPPLY
*2. OPTION
*3. GROUND SHIELD EFFECTIVELY AT BOTH ENDS.
*4. FITTED AT FACTORY.
*5. ATTACH EMI CORES.

DRAWN	MAY 29,'06 E.MIYOSHI	TITLE	FR-8062,FR-8122
CHECKED	TAKAHASHI.T	名 称	船舶用レーダー 相互結線図
APPROVED	Y. Hatai		
SCALE	MASS kg	NAME	MARINE RADAR INTERCONNECTION DIAGRAM
DWG.No.	C3539-C01- D		

FURUNO ELECTRIC CO., LTD.


FURUNO
S-2
空中線電源部 PSU-008
POWER SUPPLY UNIT
空中線部 ANTENNA UNIT
RSB-0073/RTR-087
(24/48rpm)
指 示 部 DISPLAY UNIT
RDP-150
VL3P-VV-S2X2C-AA050,5m,φ10
(03S9801)
12-24 VDC
MJ-A3SPF0018-050ZC,5m,φ10
100/110/220/230 VAC
50/60Hz,1φ
DPYC-2.5 *1
整流器
RECTIFIER
RU-3423 *2
FUSE
10A:24V
15A:12V
MJ-A3SPFZ
POWER
SVGAモニター
SVGA MONITOR
SVGA MONITOR CABLE
D-SUB 15P
副指示器
REMOTE DISPLAY
19S1004,0.5m
MJ-B24LPF0008-100/200/300,
10/20/30m,φ11.4
J802
RGB 03P9429
J110:NH-8P
SPU 03P4911
NMEA
入出力機器
DEVICE
MJ-A7SPF0007-050C,
5m,φ7
NMEA1
NMEA2
GYRO
ADコンバータ
A-D CONVERTER
AD-100
MJ-A6SPF0003-050C,5m,φ6
(Straight cable)
ヘディングセンサ
HEADING SENSOR
PG-1000
AD-10/
NMEA
MJ-A6SPF0007
-100
10m,φ6
選択
SELECT
HDG
リモートコントローラ
REMOTE CONTROLLER
RCU-019 *2
外部ブザー
EXT. BUZZER
OP03-136 *2
PC/EXT-BUZZER
DJ1
MJ-B24LPF0011-050,
5m,φ11
J1(VL3P)
J2(VL3P)
7A:24V
15A:12V
J3(VH9P)
J4(VH4P)
J5(NH13P)
J12(VH10P)
J13(VH5P)
J14(NH14P)
J11(VH2P)
03P9419
RW-9771,10/15/20/30m,φ14.5
(17C+2C2V,MAX.30m)
J821
J823
J824
J820
RTB 03P9405B
RW-4747
3pcs
GND
IV-2sq. *1
注記
*1) 造船所手配。
*2) オプション。
*3) シールドは完全に接地する。
*4) コネクタは工場にて取付済み。
*5) EMIコアを取り付ける。
NOTES
*1. SHIPYARD SUPPLY
*2. OPTION
*3. GROUND SHIELD EFFECTIVELY.
*4. CONNECTOR PLUG FITTED AT FACTORY.
*5. ATTACH EMI CORES.
DRAWN MAY.29,'06 E.MIYOSHI
CHECKED TAKAHASHI.T
APPROVED Y. Hatai
SCALE
MASS kg
DWG.No. C3541-C01- D
TYPE FR-8252
名 称 船舶用レーダー
相互結線図
NAME MARINE RADAR
INTERCONNECTION DIAGRAM
FURUNO ELECTRIC CO., LTD.